Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of Retailing and Consumer Services 61 (2021) 102570

Contents lists available at ScienceDirect

Journal of Retailing and Consumer Services

journal homepage: http://www.elsevier.com/locate/jretconser

Online consumer resilience during a pandemic: An exploratory study of e-commerce behavior before, during and after a COVID-19 lockdown

Cameron Guthrie [a,*], Samuel Fosso-Wamba [a], Jean Brice Arnaud [b]

[a] Department of Information, Operations and Management Sciences, Toulouse Business School, France
[b] Toulouse Business School, France

ARTICLE INFO

Keywords:
Pandemic
Covid-19
Environmentally imposed constraints
Electronic commerce

ABSTRACT

The COVID-19 pandemic has disrupted retail and accelerated the trend towards electronic commerce. This study explores the reasons for and the implications of this shift. Our study builds on the consumer behavior literature, emerging COVID-19 research, and the environmentally imposed constraints perspective to describe how online purchasing behavior evolved during the COVID-19 crisis. The objective is to better understand how consumers use e-commerce to react to, cope with and adapt to periods of environmentally imposed constraints. Based on multiple sources including transaction and search data from a major French online retailer, we describe how consumer behavior evolves during such stressful life events as COVID-19. Our results support the usefulness of the multi-perspective react-cope-adapt framework of constrained consumer behavior in an online environment.

1. Introduction

The COVID-19 pandemic has strongly disrupted business operations and consumer activity. While its effect on the digital transformation of organizations has been studied, the impact of COVID-19 on consumers and consumption behaviour has received relatively little scholarly attention (Kim, 2020; Verma and Gustafsson, 2020).

Industry reports and consumer surveys show that the pandemic has accelerated a trend towards e-commerce that had been observed before the crisis (Kim, 2020). The fear of the pandemic has notably influenced consumer perceptions of the economic and environmental benefits of e-commerce platforms (Tran, 2021). Some authors predict that the digitalisation of the marketplace and the habits learned during the pandemic may bring about structural changes to consumption as individuals maintain their modified behaviours once the pandemic ends (Kim, 2020; Sheth, 2020), such as those observed in China in 2002–2003 during the SARS pandemic (Clark, 2018).

Despite a global increase in online purchases since the start of the pandemic, uncertainty around the drivers of online purchasing behaviour remains. Further research is needed to understand how online consumption is evolving throughout the pandemic and the potential role of electronic commerce in a post-COVID-19 world (Barnes, 2020; O'Leary, 2020; Pejić-Bach, 2020).

This study is an initial effort towards bridging this gap in the literature by exploring how purchasing behaviours evolved before, during, and after a COVID-19 lockdown. More explicitly, this study intends to answer the following research question: How did online purchasing behaviour evolve during the COVID-19 pandemic?

To address our research question, we draw on consumer behaviour literature, emerging COVID-19 research, and the environmentally-imposed constraints perspective to study the online behaviour of new and existing customers of a leading French online retailer. Our research is exploratory and descriptive in nature, seeking "to provide a 'picture' of a phenomenon as it naturally occurs" (Bickman et al., 2009) in a relatively unexplored area (Punch, 2013). Following a case study design, we use the extant literature to structure our analysis and use a "pattern matching" procedure to compare empirically based patterns to predicted patterns of behaviour (Yin, 2009).

Our paper contributes to both literature and practice. Firstly, the paper studies how and why consumer behaviour has evolved during the ongoing COVID-19 pandemic, providing timely insights for marketers and e-tailers. To the best of the authors' knowledge, this is the first paper to explore and explain the *evolution* of online consumer purchasing behaviour during the pandemic. Secondly, the paper studies changes in consumer behaviour using a theoretical framework based on research into resource scarcity, choice restriction, social comparison, and environmental uncertainty. We believe that this multi-perspective approach best addresses the complexity of consumer reactions and actions

* Corresponding author.
E-mail addresses: c.guthrie@tbs-education.fr (C. Guthrie), s.fosso-wamba@tbs-education.fr (S. Fosso-Wamba).

https://doi.org/10.1016/j.jretconser.2021.102570
Received 5 October 2020; Received in revised form 30 January 2021; Accepted 30 March 2021
Available online 19 April 2021

throughout the pandemic.

The paper is organized as follows. The first section provides a literature review of consumer behaviour during periods of crisis and presents the theoretical framework that is used to guide our research. The research methods used in data collection and measure are then discussed, followed by a presentation of results. The paper concludes with a discussion and conclusions.

2. Literature review and theoretical framework

2.1. Online purchasing behaviour during periods of restriction

This past decade there has been growing scholarly interest in the influence of constrained and stressful situations on consumer behaviour. This was "perhaps triggered by the 2008 financial crisis, and [is] likely to be accelerated by scarcity related to the COVID-19 global pandemic" (Goldsmith et al., 2020). Despite the increasingly important role of electronic commerce during times of crisis, such as the SARS outbreak (Forster and Tang, 2005), terrorist attacks (Predmore Carolyn, Rovenpor, Manduley Alfred, & Radin, 2007), economic recession (Sarmento, Marques and Galan - Ladero, 2019) and the COVID-19 pandemic (e.g. Watanabe and Omori, 2020), few studies have examined how online consumer purchasing behaviour evolves during these periods of restriction.

Recent studies underscore consumer resilience during such times. Hamilton, Mittal, Shah, Thompson, and Griskevicius (2019) develop a framework based on work in resource scarcity, choice restriction, social comparison, and environmental uncertainty to describe the effects of financial constraints on consumer behaviour. After initially reacting to a situation created by a new constraint, consumers devise coping strategies to work within the constraint. Over time, they adapt their consumption behaviours, thus becoming less reactive and more resilient. These three stages - reacting, coping, adapting - "roughly reflect immediate reactions, short term solutions, and long-term adaptations" (p. 286).

Kirk and Rifkin (2020) adapt the react-cope-adapt (RCA) model to analyse consumer behaviour during the COVID-19 pandemic. According to the authors, consumers may react to a pandemic by hoarding goods perceived as scarce and essential. In some cases, they may reject behavioural mandates such as social distancing and mask-wearing. These behaviours are reactions to the perceived threat of the pandemic and an attempt to regain control of lost freedoms. Over time, consumers begin to cope by adopting new behaviours and exerting control in other areas. Coping behaviours include maintaining social connectedness by sheltering in place with friends or family, using video and chat software, adopting domestic animals, engaging in do-it-yourself activities to overcome product shortages, and modifying their perception of brands. Long-term adaptations include changes in consumption habits such as more home-based experiences, increased online purchasing, and retail experiences that facilitate social distancing. Coping strategies deployed to deal with stressful life circumstances often include changes in consumption activities and behaviours (Mathur et al., 2003; Mathur et al., 1999). The RCA framework is illustrated in Fig. 1.

The professional literature has also reported similar findings. For example, market research firm Neilsen describes six phases based on the study of international consumer goods markets: "proactive health-mind buying", "reactive health management", "pantry preparation", "quarantined living preparation", "restricted living" and "living a new normal".[1] The first two phases correspond to the reacting phase, the next three correspond to the coping phase, and the sixth phase corresponds to the adapting phase of the RCA framework.

Other frameworks have also been used to explain consumer responses to the COVID-19 pandemic, most notably the Stimuli-Organism-Response (SOR) framework. The SOR model states that stimuli influence a consumer's emotional state (organism) and subsequent actions (response), such as online purchasing behaviours (Mehrabian and Russell, 1974). This framework has been widely and successfully used in extant retail (Vieira, 2013) and e-commerce literature to explain how consumers react to environmental stimuli such as web atmospheric cues (Eroglu et al., 2001; Richard, 2005). More recently, Laato et al. (2020) used the SOR framework to study how exposure to online information sources in the early stages of the pandemic (stimuli) influenced a consumer's level of cyberchondria and his or her intention to make unusual purchases. The authors found that "after the data collection period for the present study ended, consumers quickly adapted to the new normal of COVID-19" and called for more longitudinal studies to capture how behaviours evolve.

As the RCA model allows for the temporal study of behaviour, we will use it to explore how online consumption specifically evolved during the COVID-19 pandemic.

2.1.1. Online reactive purchasing behaviour during COVID-19

According to Sheth (2020), hoarding was the first immediate effect of the COVID-19 pandemic on consumption and consumer behaviour. During the pandemic, consumers stockpiled essential products such as "toilet paper, bread, water, meat, disinfecting and cleaning products" (Sheth, 2020). Such unusual purchasing behaviour is a common reaction to the uncertainty of future product availability, and has been observed across the globe during the COVID-19 crisis (Islam et al., 2021). Kirk and Rifkin (2020) argue that "if the scarce items are perceived to be important and the threat of continued availability high, consumers will seek to restore control by hoarding." In a recent study of 211 staff and students at a Finnish University during the COVID-19 pandemic, Laato et al. (2020) found that unusual purchasing behaviour could be partially explained by intentions to self-isolate and the level of anxiety related to health issues. Social media (Naeem, 2021) and public policy (Prentice et al., 2020) have been shown to exacerbate these panic buying tendancies.

Given the likelihood of further waves of COVID-19 and future pandemics, there have been calls to identify and explain the types of products that are being hoarded by consumers (Kirk and Rifkin, 2020). During the SARS pandemic, for example, there was notably a "dramatic rise" in orders for cleaning products, such as bleach from Hong Kong's leading online retailer (Forster and Tang, 2005). During a health crisis, consumers may consider disinfectants and sanitizers as essential purchases to allay health concerns. Purchases of products to limit the health threat of a pandemic may be higher during the reacting period of the crisis.

2.1.2. Online coping purchasing behaviour during COVID-19

The second stage of response to a constraint is coping. After a period of time, consumers adjust their thinking and decision making to attenuate and cope with the constraint (Hamilton et al., 2019). Coping can either be problem-focused or emotion-focused (Lazarus and Folkman, 1984).

Problem focused coping involves actions that directly address the problem and actions that allow the individual to adjust to the situation to make life less stressful. For example, during the SARS epidemic in Hong Kong, online purchases of hand sanitizer and disinfectant, and staples such as rice, oil, meat, fish, and vegetables dramatically increased, as consumers turned to online shopping to maintain some semblance of normalcy during the crisis (Forster and Tang, 2005). The ongoing nature of the COVID-19 crisis has led consumers to reevaluate their spending priorities. According to a survey by McKinsey & Co conducted in the US during the coping phase (July 2020), "spending on essentials is the only category with positive intent" (Arora et al., 2020). In the case of a pandemic, goods essential for survival could include water, food, cooking supplies, protective equipment, and cleaning products.

[1] https://www.nielsen.com/us/en/insights/article/2020/key-consumer-behaviour-thresholds-identified-as-the-coronavirus-outbreak-evolves/.

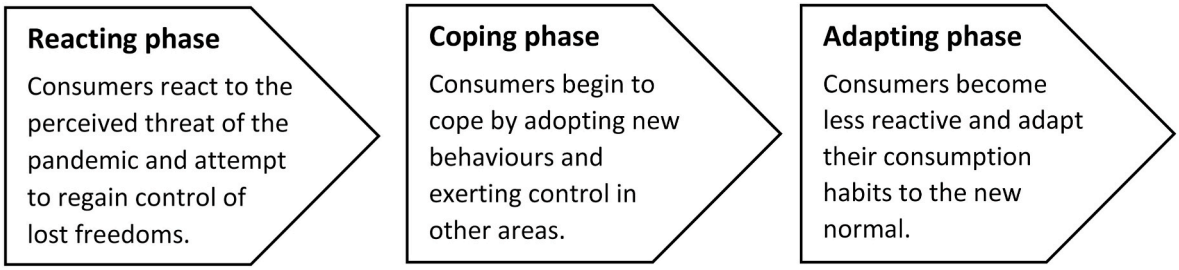

Fig. 1. Stages of the React-Cope-Adapt framework.

Emotion-focused coping activities are directed towards an individual's own feelings and emotions and often seek to take one's mind away from the problem. Examples include turning to religion, therapy or distracting oneself (Carver et al., 1989). Consumers may purchase emotion-focused products during the coping phase that allow them to focus on themselves, such as personal care and well-being goods.

Another coping strategy is to seek out social connectedness "not only with other humans, but also with other living beings" (Kirk and Rifkin, 2020). A large number of US households reportedly adopted a pet during the COVID-19 lockdown (Phillips, 2020) and increasingly engaged in DIY pet grooming.[2] A number of pet shops in France also reported giving away guinea pigs and mice (Grassaud, 2020) and an increase in sales of fish and chickens (Diouris, 2020). As supermarkets were often closed during periods of lockdown, pet owners increasingly turned to online merchants for pet care supplies and veterinary products.

2.1.3. Online adaptive purchasing behaviour during COVID-19

Stressful events such as terrorist attacks, natural disasters, and pandemics also result in long-term behavioural shifts and changes in consumption lifestyles "to adapt to new life circumstances" (Mathur et al., 2003). The COVID-19 pandemic, lockdown, and social distancing measures have disrupted buying and shopping practices and led consumers to experiment with new channels and learn new habits. In a recent study, McKinsey & Co. reported that 75% of US consumers had tested new brands or channels during the crisis, with many adopting "digital and contactless services including curbside pickup, delivery, and buying online for in-store pickup" (Arora et al., 2020). Most consumers planned to continue using omnichannel or fully digital retailers once the crisis subsided. Market research firm Neilsen recently reported that Chinese "pandemic-led shifts to further online adoption and an increased focus on neighborhood and small-format stores have become an ongoing normal".[3]

Consumers may discover that online shopping and home delivery is practical, cheaper, reassuring and allows them to overcome the stress imposed by new sanitary rules and regulations in retail outlets. Following the confinement period, customers may be concerned about contamination and adapt their behaviour accordingly (Hazée and Van Vaerenbergh, 2020), such as continuing to shop online.

A final possible behavioural change brought by the pandemic may be the recruitment of previously reticent online consumers. Kim (2020) uses innovation diffusion theory to argue that the pandemic has incited "late adopters" to buy online for the first time. Late adopters learn to online shop during the pandemic, and the convenience and safety of online shopping may help overcome their skepticism and motivate them to continue shopping online after the pandemic ends. Late adopters of online purchasing are typically older consumers (Liu et al., 2019).

2.2. Research proposition

Based on our review of the extant literature, we propose that online consumption behaviour followed three phases and we expect to observe the following pattern of behaviour: Consumers first react to the perceived threat of the pandemic and attempt to regain control of lost freedoms by purchasing and hording products that limit the health threat. Consumers then begin to cope by adopting new behaviours and exerting control in other areas, such as personal well-being. Finally, consumers become less reactive and adapt their consumption habits to the new normal, continuing to purchase products online.

3. Research methodology

We employed a descriptive single-case research design to explore online consumer behaviour during the pandemic. A descriptive case based approach is appropriate when an area is relatively new or unexplored (Punch, 2013). This is notably the case for online behaviour during times of crises. Also, there have been a number of calls in the literature for more empirical observation and descriptions of customer behaviour during the COVID-19 crisis (Kirk and Rifkin, 2020; O'Leary, 2020; Pejić-Bach, 2020; Sheth, 2020). Consistent with our research proposition, the unit of analysis was the consumer cohort that purchased online during the period.

3.1. Case study planning and design

Descriptive research seeks to make causal propositions by exploring and describing links between independent and dependant variables. Descriptive designs are driven by questions that are concerned with quantifying an area or a phenomenon, such as "describing only one variable, comparing the variable to a particular standard, or summarizing the relationship between two or more variables." (Bickman et al., 2009). Such descriptive, causal propositions contribute to building a foundation for understanding relationships before explanatory research formally tests them.

Case studies often form the basis of descriptive research as they allow for a rich contextual description of the phenomenon under study. Researchers often select cases that "tell a lot about the underlying conditions and causal mechanisms at work" (Reiter, 2013, p. 8). The case study research method is particularly suitable when the research question is "how" and "why" in nature, where there is no need to control variables and where there is a focus on contemporary events (Yin, 2009).

The research site for our case study was a major French online retailer of para-pharmaceutical, health care, well-being goods and beauty products ("CyberPharma"[4]). CyberPharma is the industry leader in France with a turnover of over 100 million euros per year.

The company was selected for the study as it was considered to be a "representative" or "typical" e-commerce company. Following Yin,

[2] https://www.nielsen.com/us/en/insights/article/2020/shoppers-reprioritized-sense-of-self-care-leads-to-a-rise-in-diy-pet-grooming/.

[3] https://www.nielsen.com/us/en/insights/article/2020/chinas-shifting-retail-landscape-signals-the-permanence-of-change-post-covid-19/.

[4] The name of the company has been changed to preserve anonymity.

2009, a single case study is justified on the grounds of its representative nature, where "the objective is to capture the circumstances and conditions of an everyday or commonplace situation" (p. 48). The research team considered CyberPharma's revenues, product range, headcount and business processes to be representative of an e-commerce company in France. CyberPharma management also offered privileged access to its online transaction and search data and was interested in reflecting on changes in customer behaviour during the Covid-19 crisis.

A common criticism of single case study research is its generalizability. The goal of a single case study design is theoretical or analytical generalizability rather than statistical generalization. As the study's objective was to test the pertinence of the RCA framework to describe online purchasing behaviour during a pandemic, the single case design using a "typical" case was considered appropriate. A second concern may be the representativity of CyberPharma. While the company was considered an appropriate case for theory development, studies of other companies in other sectors respresent an interesting avenue for future research (see section 5.2).

Multiple data types and sources were used to draw a rich picture of consumer online purachsing behaviour during the pandemic, and a "pattern matching" technique was used to test the theoretical framework (Yin, 2009). Pattern matching involves comparing the observed pattern of behaviour from case data with an expected pattern of behaviour based on the extant literature, and that has been formulated ex ante (Hak and Dul, 2009). If there is a match, the case study supports the proposition and confirms the theory; if there is a mismatch, the data disconfirm the theory and an alternative explanation for the pattern is required (Almutairi et al., 2014; Trochim, 1989). Fig. 2 illustrates the pattern-matching process.

Following our research proposition, we expect to observe the following pattern of behaviour: Consumers first react to the perceived threat of the pandemic and attempt to regain control of lost freedoms, before coping by adopting new behaviours and exerting control in other areas, and then adapting their consumption habits to the new normal and continuing to purchase online.

3.2. Data collection

We collected and analysed data at two levels for the purposes of our study. Firstly, French country-level data was collected from multiple sources to describe the trend in COVID-19 contagion and deaths, the evolution in consumer sentiment and e-commerce activity over the period. Sentiment data was used to establish a periodization following the RCA framework, and e-commerce data was used to verify that CyberPharma's activity was representative of the national trend.

Secondly, data was collected from CyberPharma to construct a pattern of behaviour for the consumer cohort that frequented CyberPharma's website during the period. Management of CyberPharma provided both transaction and search data. Transaction data included online sales for the period beginning 12 months prior to the COVID-19 pandemic (January 2019) to the second month following the end of the mandated shelter-in-place restrictions in France (July 2020). Search data included all search terms keyed in by website visitors over the seven month period from January 2020 to July 2020. All data were anonymised, and it was not possible to identify individual customers. Interviews were conducted with management to understand the organizational challenges that accompanied the crisis, and the company's social media activity was also analysed.

4. Results

The following section first outlines the evolution of the COVID-19 pandemic in France during its first six months (February to July 2020), and its impact on consumer sentiment and electronic commerce at a national level. This period covers the start of the pandemic and the first mandated shelter-in-place restrictions in France. Online purchasing, search and social media activity at CyberPharma are then presented and analysed. Following our pattern matching process, the observed pattern is described and then compared to the predicted pattern based on our literature review.

4.1. The COVID-19 pandemic in France

The COVID-19 crisis began in France in January 2020, and the number of daily cases peaked three months later. The evolution of COVID-19 related hospitalizations and deaths in France is provided in Fig. 3, and a timeline of key dates of the COVID-19 pandemic in France is presented in Table 1.

During January and February the French government relied on existing structures and procedures to contain the pandemic. On February 18, the Minister for Health, Olivier Véran declared that "France is ready as we have an extremely solid health system".[5] Desson, Weller, McMeekin, and Ammi (2020), note that the French government "was relatively complacent as the first cases were counted and only implemented severe measures once infections began to rapidly rise" (p. 437).

As the virus continued to spread, the WHO declared COVID-19 a pandemic and world stock markets crashed on March 11. In France, social distancing measures including the closure of schools, restaurants, and non-essential business activities were introduced throughout the first two weeks of March, with President Macron declaring on March 16 that "we are at war with this virus".[6] Shelter-in-place orders were effective starting March 17.

Shelter-in-place orders and travel restrictions were gradually lifted starting May 11, but cafés, schools, and restaurants did not reopen until the start of June. In early June, non-essential businesses reopened and an increasing number of workers were summoned back to work. By mid-June, President Macron declared that "we can turn the page of the first act of the crisis that we have just been through".[7]

4.1.1. Evolution of French consumer sentiment

Consumer sentiment in France evolved throughout the pandemic (Kruspe et al., 2020). The general public was not particularly alarmed by the virus until late February, as illustrated by activity at the annual Salon de l'Agriculture held in Paris from February 22 to March 1 2020. The initial attendance levels and number of exhibitors were equivalent to previous years, but as the number of cases grew in late February attendance began falling and the final day of the Salon was cancelled. In total 483 000 people visited the Salon compared to 563 000 over the same period in 2019.

This increasing public recognition of the gravity of the crisis can also be observed in the sharp rise in COVID-19 news coverage from mid-February until the end of March. In a study of 33,864 French news reports Starosta et al. (2020) found that the majority carried negative sentiment until the start of the shelter-in-place period in mid-March and that the level of news coverage was correlated with Covid-19 related searches on Google.com. News reports, media negativity and related online searches all declined during the lockdown period (mid-March to mid-May).

Further analysis of consumer reaction to the pandemic was undertaken to verify whether it could be periodized according to the react-cope-adapt framework. Sentiment analysis was conducted on a dataset of 2,598,249 French language tweets that used the same daily

[5] https://www.franceinter.fr/emissions/l-invite-de-8h20-le-grand-entretien/l-invite-de-8h20-le-grand-entretien-18-fevrier-2020.

[6] https://www.nytimes.com/2020/03/16/world/europe/coronavirus-france-macron-travel-ban.html.

[7] https://www.wsj.com/articles/macron-seeks-to-turn-page-on-coronavirus-in-france-11592168578.

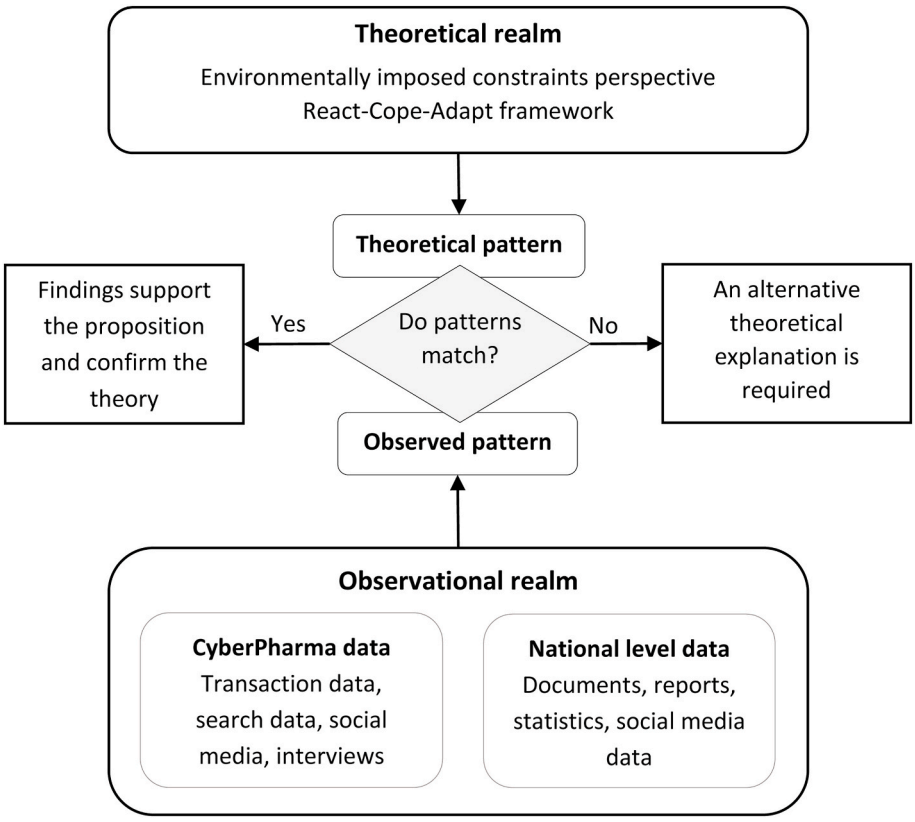

Fig. 2. The pattern-matching process.

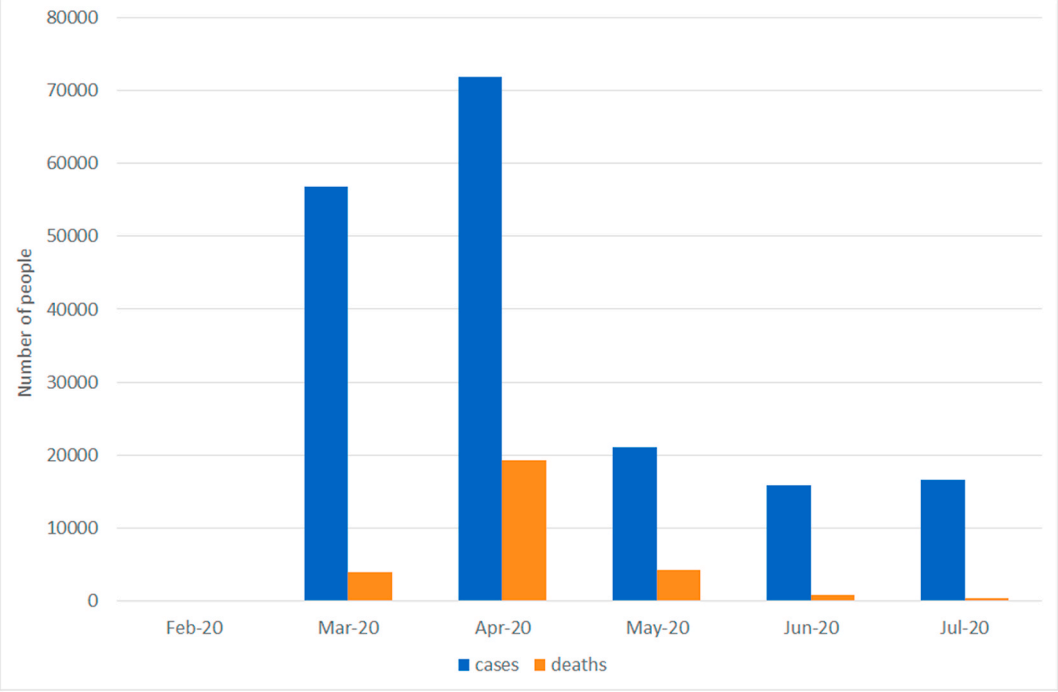

Fig. 3. Number of COVID-19 cases and deaths in France per month (2020). Source: www.santepubliquefrance.fr.

Table 1
Key dates of the COVID-19 pandemic in France.

Date	Event
December 31, 2019	China informs the WHO of several cases of pneumonia in Wuhan.
January 23, 2020	Flights between Wuhan and Paris are suspended.
January 24, 2020	First COVID-19 cases reported in France.
February 14, 2020	First death attributed to COVID-19 in France.
February 18, 2020	Minister for Health, Olivier Véran declares that "France is ready as we have an extremely solid health system"[a].
February 29, 2020	Events involving over 5000 people are forbidden in France.
March 9, 2020	Events involving over 1000 people are forbidden in France.
March 11, 2020	All visits to nursing homes are forbidden in France. WHO declares COVID-19 a pandemic. Paris Stock Market crashes.
March 12, 2020	President Macron announces the closure of all childcare centers, schools and universities in France. All French workers are encouraged to telecommute.
March 13, 2020	Events involving over 100 people are forbidden n France.
March 14, 2020	Prime Minister Philippe announces the closure of all non-essential activities. Pharmacies, banks, supermarkets, service stations, tobacconists and newsagents remain open.
March 15, 2020	First round of municipal elections is maintained. Participation is 20% lower than in the previous election.
March 16, 2020	President Macron announces a shelter-in-place order starting March 17 for a minimum of 15 days. He states six times during his speech that "France is at war" with Covid-19.
March 17, 2020	National shelter-in-place order comes into effect at midday.
March 22, 2020	First French doctor dies of COVID-19.
March 16, 2020	President Macron announces that confinement measures are to take effect the next day at midday. France is "at war with the virus".
March 27, 2020	Prime Minister Philippe announces a prolongation of the confinement period until at least April 15.
April 13, 2020	President Macron announces a prolongation of the confinement period until May 11.
April 28, 2020	Prime Minister Philippe announces the deconfinement measures to apply on May 11.
May 11, 2020	End of confinement period in France. Cafés, hotels, and restaurants remain closed. Travel limited to 100 km from domicile.
May 28, 2020	Prime Minister Philippe announces the second phase of deconfinement starting June 2: travel within France is no longer limited; cafés, schools, and restaurants can reopen with social distancing measures.
June 14, 2020	President Macron announces that the "we can turn the page of the first act of the crisis that we have just been through"
July 20, 2020	As the number of cases increases, masks are made obligatory in all enclosed public spaces.

[a] https://www.franceinter.fr/emissions/l-invite-de-8h20-le-grand-entretien/l-invite-de-8h20-le-grand-entretien-18-fevrier-2020.

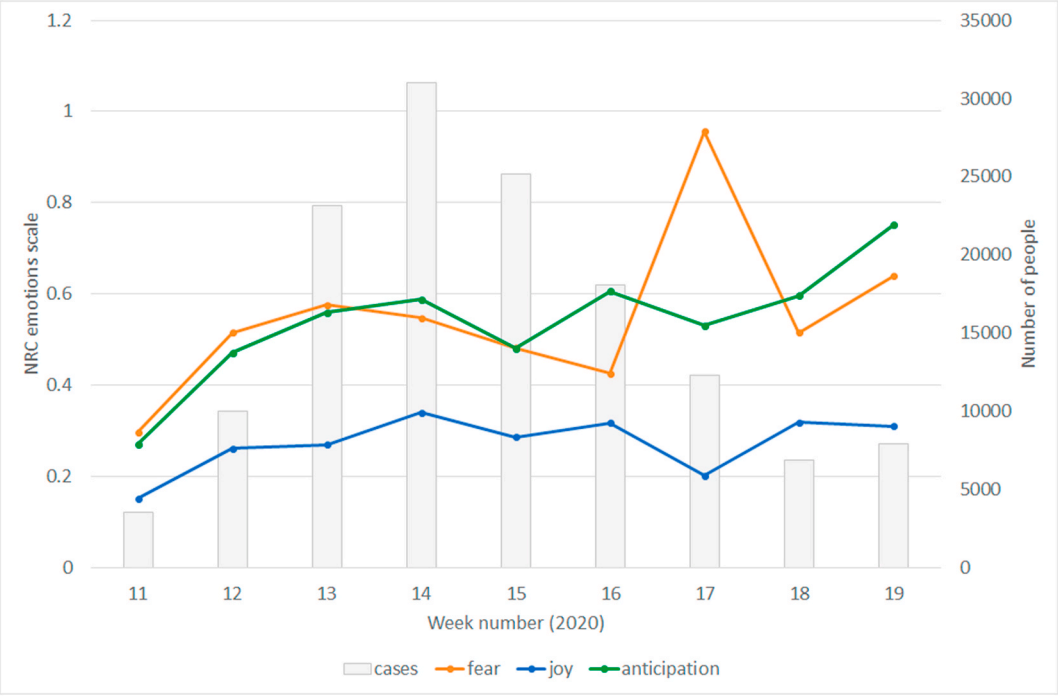

Fig. 4. Evolution of sentiment in France during the confinement period (chart from March 9 to May 10, 2020).

confimement hashtag (e.g. #LockdownDay27[8]) collected between March 17 and May 11 2020 by Balech et al. (2020). Twitter was considered an appropriate medium to analyse as it is a "network where states of mind can express themselves freely" and the development of the hashtag helped "share experience and mood" (p. 1). Each tweet had been coded using Plutchick's (1982) typology of eight basic emotions (anger, fear, anticipation, trust, surprise, sadness, joy, and disgust) based on word occurrence using the National Research Council Canada (NRC) emotion lexicon (Mohammad and Turney, 2013). The dataset was further analysed by the authors using the R statistics language.

According to a functional approach to emotions, individuals cognitively evaluate the beneficial or harmful events that occur in their environment, react by generating introspective feeling states ("emotions") and engage in behaviours to deal with the stimuli. Emotions are part of a "complex chain of reactions which has adaptive value for the individual in dealing with various kinds of life crises or survival problems" (Plutchik, 1982, p. 543) and have been shown to be powerful drivers in consumer decision making and behaviour (Gaur et al., 2014; Lerner et al., 2015). In this study, we use Plutchick's (1982) typology to establish the react-cope-adapt periodization.

In this study, we propose that a dominant basic emotion may describe each of the three phases of the react-cope-adapt framework. During the reacting phase, consumers are expected to react to the perceived threat of the pandemic. Following Plutchik (2001), the main basic emotion is *fear*, an emotional response to an environmental threat. During the coping phase, consumers cope by adopting new behaviours and engaging in new activities to reduce stress. The main basic emotion may be *joy*, which corresponds to the gain and possession of a new and valued object or resource. During the adapting phase, consumers adapt their behaviours to the new normal. According to Plutchik (2001), the discovery of such "new territory" may evoke emotions of anticipation as consumers begin to "map" their transformed environment (Gaur et al., 2014).

The emotions of fear, joy and anticipation identified from word occurrence in the tweet dataset were charted over the confinement period (Fig. 4).

All three emotions varied over the period, peaking or troughing sharply in mid-April with the announcement of an extension to shelter-in-place orders. Fear steadily increased over the first month of the confinement period (weeks 11–13), before falling from the end of March (week 14) until mid-April (week 17). The trend in this emotion may indicate that the reacting phase lasted the month of March. Levels of joy increased steadily from week 11 onwards, before peaking in the last week of March and stabilising for the remainder of the period, apart from the trough in week 17. This trend may indicate that the coping phase began in early April as consumers began experiencing joy through their coping strategies, often involving the discovery of new activites and resources, such as available time. Anticipation rose throughout March (weeks 11–14), fell in early April and then increased as the confinement period was expected to end (weeks 16 and 19). This trend may indicate that the adapting period began following the end of the lockdown period, in the second half of May or early June, as consumers begin to map out their new environment.

Kruspe et al. (2020) reported similar results from a study of 79,000 geotagged English language tweets containing a COVID-19 keyword. In France "towards the end of the considered period [April 2020], keyword-only [positive] sentiment actually starts to increase, which is also seen in Italy and Germany. This could indicate a shift to a more hopeful outlook with regards to the pandemic".

Based on the evolution of sentiment over the first six months of the pandemic in France, we propose the following periodization:

- Reacting phase: March 2020
- Coping phase: April and May 2020
- Adapting phase: June and July 2020

While there may be a degree of overlap between these phases as several emotions can be experienced simultaneously (Manthiou et al., 2020), monthly delimiters are used to facilitate the interpretation of data.

4.1.2. Electronic commerce activity in France

The closure of all "non essential" stores during the lockdown period (March to May 2020) led to a surge in electronic commerce activity, as shown in Fig. 5.

While most online retailers reported a fall in traffic and sales during March 2020, a small number of product categories experienced exceptionally strong growth and drove an e-commerce rally in the last week of March and early April. According to the French Federation of e-commerce and distance selling (FEVAD):

> "The three weeks of March were marked by an unprecedented overall decline in sales of non-food products on the internet, compared to the week preceding the crisis. This decrease started on March 9, the week shelter-in place restrictions were first announced. Then the gap widened the following week as restrictions took hold and stores closed. It is only from the end of March, that the sales curve picks up after the shock of containment had passed.
>
> This recovery was largely driven by certain product categories, including IT, indoor activities and gardening, for which sales accelerate very clearly in the week following the start of confinement (+27%), before plateauing over the following two weeks."[10]

Fast moving consumer goods (+55%), pharmacy and health (+49%) and home goods (+46%) in particular experienced strong year-on-year growth during the lockdown period (Fig. 6).

A similar result was reported by Forster and Tang (2005) during the SARS epidemic in Hong Kong when the online supermarket, Park'N Shop saw sales "dramatically" increase over the period and remain at high year-over-year levels during the following months.

After the lockdown period, online purchases of essential goods remained stable, and the sales of clothes and accessories, cultural products, home improvement supplies, and materials for indoor and outdoor activities returned to pre-lockdown levels.[11]

A study of French consumers during and after the confinement period found that most online buying behaviour during the lockdown was driven by the stress and constraints attributable to the COVID-19 crisis.

> "Their motivations are closely linked to the health context. Online shopping has enabled them to have access to essential products (for 31%), to withstand the constraints related to confinement (32.3%) and to avoid exposure to health risks (51.4%)".[12]

The study also reported that over one-third of all French online consumers believed that the lockdown period had shifted their consumption habits: Consumers plan to buy online more regularly "to continue to remain safe during this prolonged health crisis." Consumer expectations of local stores also changed, with three out of four French

[8] In French, #ConfinementJour27 was used to mark the 27th day of the lockdown. The hashtag incremented by one digit with each day of the lockdown.

[9] Based on a consumer panel of 12 000 individuals, June 2020. Consumer services excluded.

[10] https://www.fevad.com/retour-sur-5-semaines-de-crise-COVID-pour-le-e-commerce/.

[11] https://www.fevad.com/les-habitudes-dachat-en-ligne-entre-confinement-et-deconfinement/.

[12] https://www.fevad.com/barometre-trimestriel-de-laudience-du-e-commerce-en-france-enquete-e-commerce-et-confinement/.

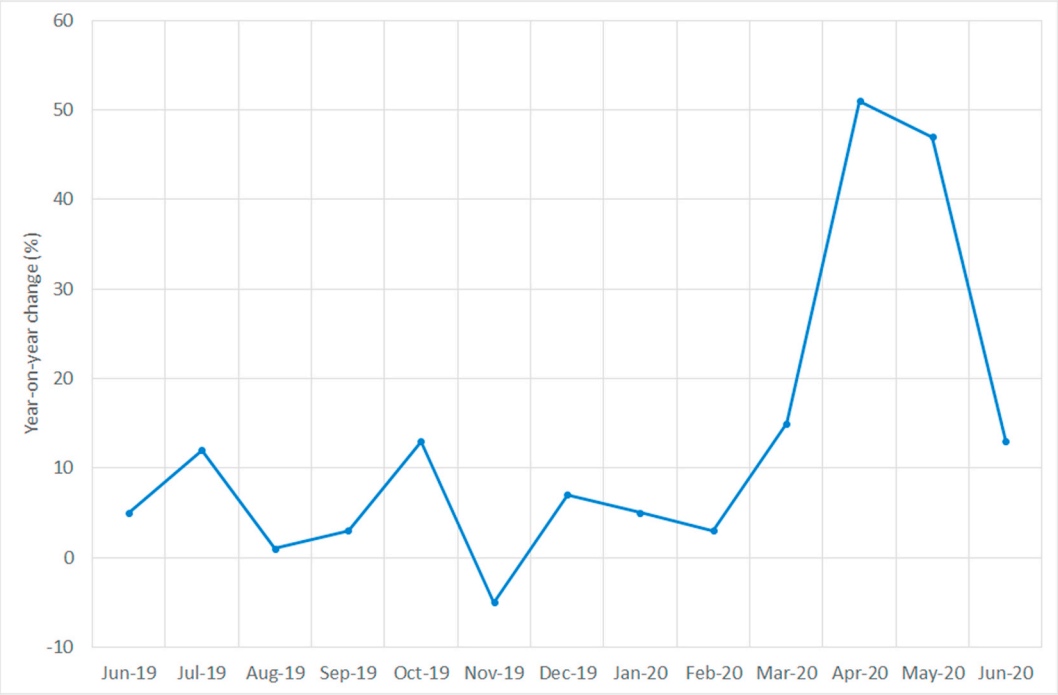

Fig. 5. Year-on-year growth in e-commerce sales in France (June 2019 to June 2020). Source: Kantar Worldpanel.[9].

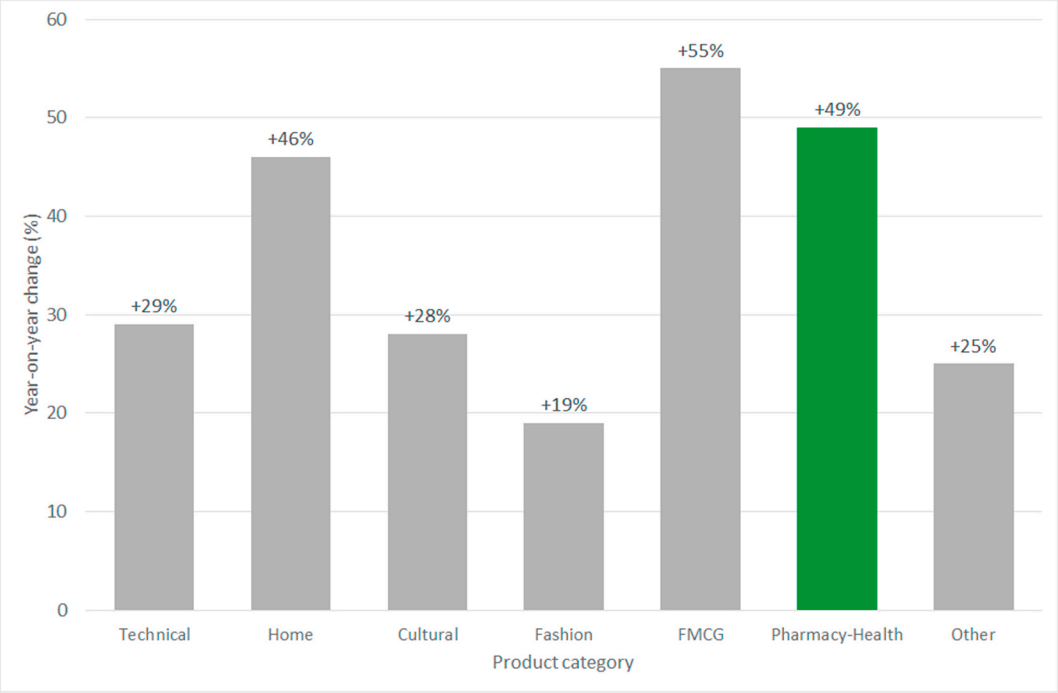

Fig. 6. Year-on-year growth in e-commerce sales in France by sector during lockdown (March to May 2020). Source: Kantar Worldpanel[8].

consumers expecting to use home delivery services in the future. The report concluded that "this unprecedented episode will therefore have initiated or even converted some Internet users to online shopping".

4.2. Activity at CyberPharma during the pandemic

CyberPharma was founded in 2008 by two pharmacists. It has since grown to a company with an annual turnover of 100 million euros. The company sells a range of items online organized across fifteen product families (see Table 2).

Fig. 7 confronts the rise in monthly orders to the trend in reported COVID-19 cases. After remaining stable in January compared to the previous year (+2.3% year-over-year growth (YoY)), online orders significantly increased in February (+14.2%) and throughout the

Table 2
Product families distributed online by CyberPharma.

Product family	Best selling categories	% turnover
Health	Health and well-being supplements for urinary, circulatory and joint comfort, natural defenses, vitality, sleep and digestion.	23%
Nutrition and dietetics		18%
Face care	Anti-aging and anti-wrinkle creams and serums, moisturizers, nourishing creams, cleansing and makeup removal.	13%
Mother & baby	Baby care, cleansing, diapers, and wipes. Toothcare, gels, and creams for young children.	10%
Organic and natural	Organic cosmetics and healthcare, gemmotherapy and herbal medicine, essential oils and aromatherapy.	10%
Personal hygiene	Shower and bath gels, oils, creams and soaps, scrubs and exfoliators, bubble baths and bath salts. Toothbrushes and pastes, interdental brushes, mouthwash. Menstrual protection, intimate wipes, and gynecological care.	7%
Body care	Hydration, atopic skin care, stretch mark, anti-cellulite, scrubs, nourishing and repair creams.	4%
Hair care	Shampoo, conditioner, hair masks and repair.	4%
Equipment and accessories	Plasters, bands and bandages, compresses, masks and gloves. Incontinence protections, measuring, and testing devices for health issues.	2%
Makeup and perfume	Correctors, concealers, foundations, blushes, eye and face makeup removers, perfumes.	2%
Sun care	Sunscreens, suncare dietary supplements, and after-sun care.	2%
Veterinary	Petfood, flea, tick and worm treatment, accessories.	2%
Men	Shaving foams, gels, aftershave, razors, facial cleansers, exfoliators, moisturizers, anti-wrinkle creams, shower gels, deodorants.	1%
Sexuality	Gels, lubricants, food supplements, birth control.	1%
Sport	Gels, creams and patches for muscle and joint pain, protein and amino acid supplements.	1%

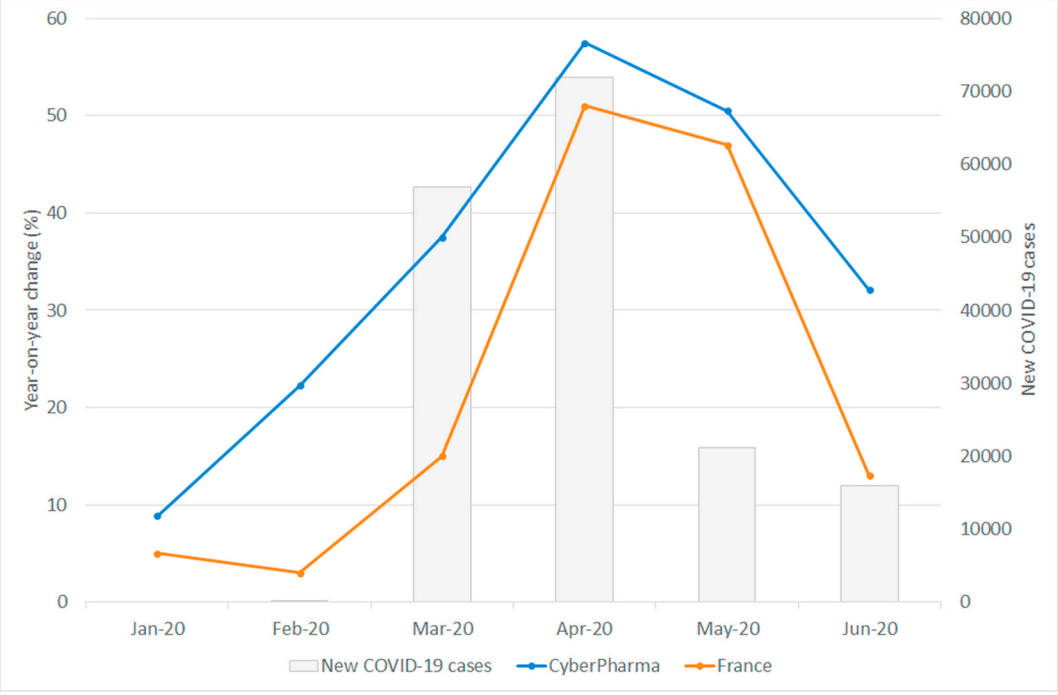

Fig. 7. CyberPharma and national e-commerce activity vs COVID-19 cases in France (January to June 2020).

lockdown period in March (+23.8%), April (+34.6%), May (+35.4%) and also as restrictions were eased in June (+21.3%) and July (+22.6%).

A similar trend can be observed in average order value and the average number of items per transaction (Fig. 8).

The number of items per order first increased during March before falling in May and plateauing in June and July. Online shoppers bought a higher number of products per order at the start of the pandemic in France (reacting phase).

CyberPharma's results contrast with the overall performance of e-commerce in France that fell significantly during the month of March before recovering and plateauing in April and May. However, they are consistent with the pharmacy and health product category (Fig. 6) that experienced strong year-on-year growth during the period at a national level. CyberPharma management reacted swiftly to the pandemic by focused on fulfilling the sharp rise in online orders.

4.2.1. *Management reaction to the pandemic*

The spike in online activity at CyberPharma was fueled by significant increases in orders, repeat orders and order size. Interviews were undertaken with the Chief Executive Officer (CEO) and the Head of Data Analytics (HDA) to gain further insight into the way the company reacted to the pandemic.

> "We had twice as many new customers in March as compared to February this year because of Covid, and the retention rate, the share of customers we kept from one month to the other went from 7% in February to 10% in April. Most of our products last three months, you know creams or supplements you don't buy every month, right? But from March to April we had a lot more new customers and 10% of them, 50% more of them basically came back. The average order size clearly jumped for new and old customers alike." HDA, 22/07/20

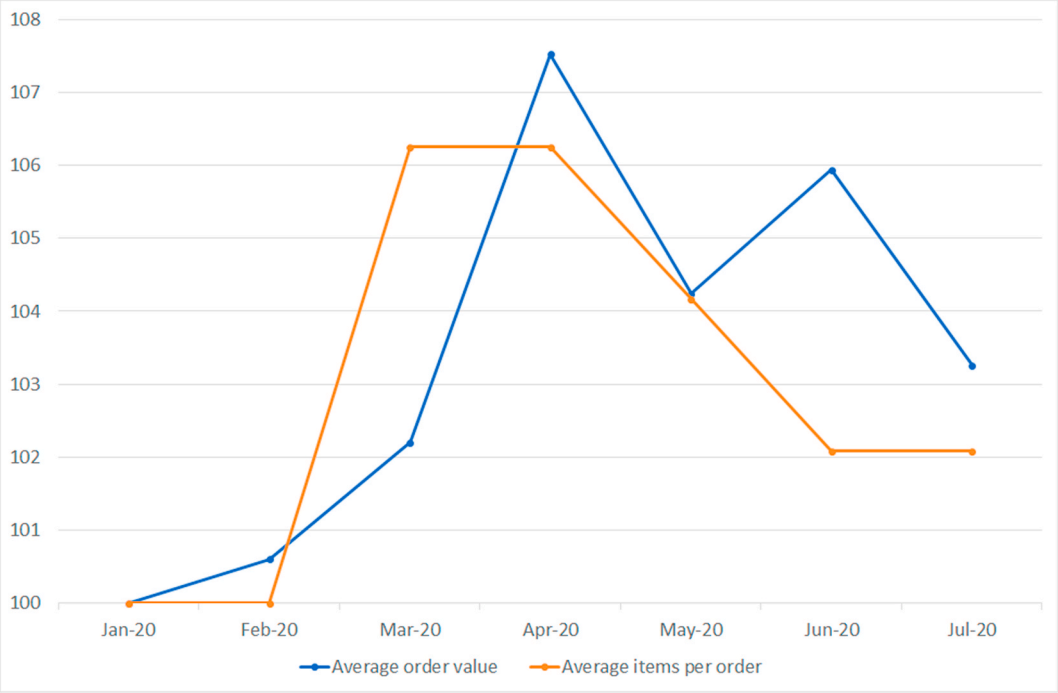

Fig. 8. Average order value and items per transaction at CyberPharma (January to July 2020) (base 100 in January 2020).

As website visits and orders began rapidly increasing in February, CyberPharma management focused on order fulfillment and ceased all marketing and promotional activities. The rapid increase in orders led the company to recruit 100 pickers across the first two months of the pandemic. Picking involves locating products and grouping them together to be packed and shipped.

> "We quickly saw that we were way above our forecast. And based on that we tried to gauge how much more workforce we needed because we knew that to get that many orders, you know how many people you need to get and need to train." CEO, 22/07/20

The company believes it benefited from the simplification of processes and new technologies that had been deployed when it moved to its new warehouse 2017.

> "It used to be way more complex for somebody to actually know where the product's were, and to know what products to pick. They had to find and read printed information to understand if they had the right products, and all areas look much the same in the warehouse. It's not scalable. Using radios that tell you what to do is scalable, and so that's one of the reasons why we I think we survived COVID." CEO, 22/07/20

Moving to the new warehouse had also provided practice in managing customer relations during a crisis.

> "The good thing is we've been through some crises of our own making. We moved, for instance, and moving while your still operating, well you can imagine that you have like, products here, products in the warehouse already or not; it's a nightmare ! It was a good rehearsal for what we went through with COVID in terms of like crisis management, and how you communicate with customers." CEO, 22/07/20

All marketing, advertising and social media activity was reduced during the lockdown period to focus on order fulfillment.

> "I said to the people in charge of customer service and people are in charge of like social media to 'Stop everything ! Stop talking, stop talking ! The only thing that people need to know is that we are alive, we know that they have a order with us and we are working. Period.' We even shut down our phone service during the crisis. No more formal communication. Why? Because we had nothing interesting to say except just like, 'yeah, we know we're late'. During the crisis, as soon as we hit more than 48 hours, we sent an email automatically saying 'We know, we haven't sent your order. It's still in our system. We know we have it, we're going to tackle it, we're going to handle it and you're going to receive an email as soon as it's done.' And this helped a lot. Some customers replied and most simply said 'Thanks' or 'Good luck'"

An examination of social media and website activity at CyberPharma confirms this fall in publications (Fig. 9) as the company reduced its activity to essential, crisis related communications.

Social media engagement (i.e. total likes and shares) also significantly fell over the period compared to the previous year. The exception was for the month of April when customers engaged strongly with an article entitled "Antibacterial disinfectant gel, hydroalcoholic gel".

According to management, customer acceptance of the company's fulfillment difficulties was aided by the publicly known problems encountered by e-commerce in general during the crisis.

> "Why it worked is because at the same time, Amazon went from like 24 hour delivery to a week or two so everybody knew there was a mess. They knew it and accepted it. But what they appreciated was us saying that 'this is the situation' and 'this is solid'. So for instance, in terms of emailing, normal advertising, and advertising on social media, it was a distraction and proved that you don't really address the main point: their frustrations." CEO, 22/07/20

We will now examine how online purchasing evolved throughout the period under study.

4.2.2. *Online purchasing behaviour at CyberPharma*

A closer inspection of sales by product family in Table 3 reveals that the "personal hygiene" product family showed the strongest growth of all product families during the reacting phase of the crisis (March, +56%

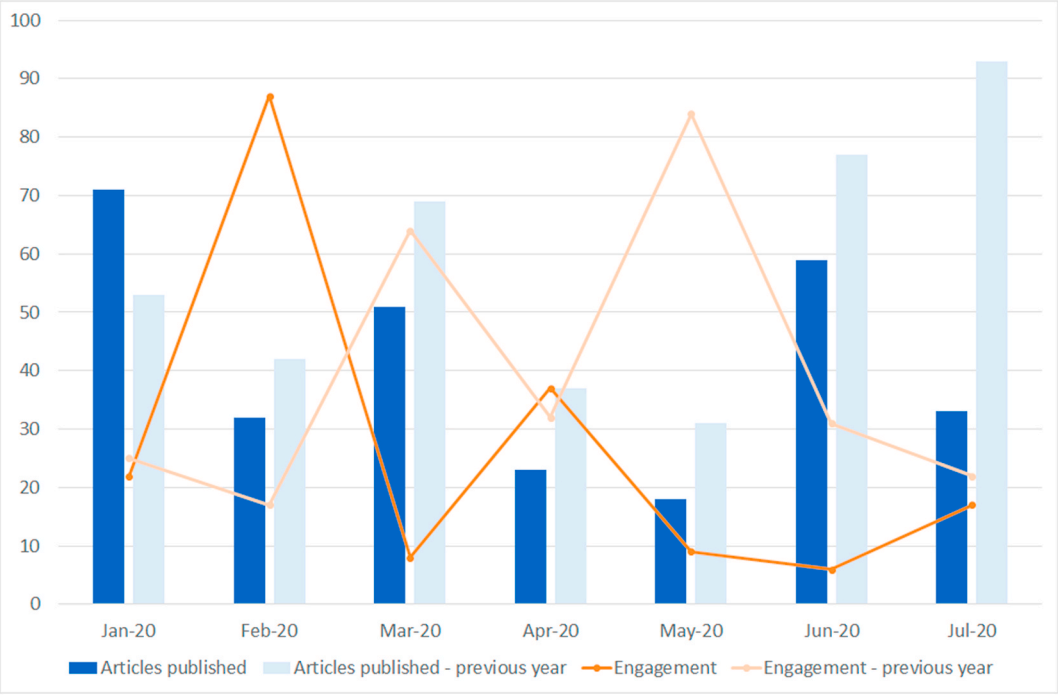

Fig. 9. Engagement levels with web content (articles, blogs, news) (January to July 2020). Source: www.buzzsumo.com.

Table 3
Year-over-year growth in sales by product family during the COVID-19 crisis.

Product family	Jan-Feb	March	April-May	June-July
Mother & baby	12%	39%	25%	17%
Organic and natural	13%	47%	51%	31%
Hair care	14%	27%	60%	34%
Body care	8%	39%	68%	34%
Men	-3%	-4%	46%	17%
Personal hygiene	23%	56%	106%	49%
Makeup and perfume	11%	20%	50%	28%
Equipment and accessories	32%	48%	59%	86%
Nutrition and dietetics	17%	40%	38%	32%
Health	17%	48%	44%	33%
Sexuality	0%	-1%	26%	13%
Sun care	3%	-22%	71%	10%
Sport	10%	-6%	14%	21%
Veterinary	70%	22%	189%	88%
Face care	6%	25%	64%	22%

Legend

+	10-25% change
+ -	25-50% change
+	>50% change

YoY).

The two best-selling product categories in this family during this period were "home and environment" products including disinfectants and sanitizers (+100.7% YoY) and hand hygiene products, including soaps and hydroalcoholic gels (+474%). Purchases of products that limit the health threat increased during the reacting phase (March).

During April and May, several product families exhibited strong YoY growth. Sales of face masks, gloves, and other protective equipment (+76.8%) drove the growth of the "Equipment and accessories" category. Other essential para-pharmaceutical purchases made during this

Table 4
Top 10 search term categories (month-on-month % growth).

Search term domain	Feb	March	April	May	June	July
Hydroalcoholic gel	5.7	**58.9**	32.6	25.4	6.3	5.5
Personal grooming	0.9	1.3	1.9	1.6	1.4	1.3
Masks	5.1	8.4	17.2	**18.8**	1.9	3.9
Immunity	1.0	**3.1**	2.5	1.6	1.1	1.0
Thermometer	1.8	**18.0**	13.0	12.5	4.4	3.9
Gloves	1.6	32.0	**56.7**	43.6	9.9	7.5
Paracetamol	1.2	**7.5**	2.6	1.5	1.0	1.1
Aromatherapy	1.0	**3.6**	2.3	1.6	1.2	1.1
Mother and baby	0.8	1.1	**1.4**	1.2	1.0	0.9
Hydroxychloroquine	1104.5	**7305.5**	499.5	48.0	7.5	22.5

Growth in search queries for masks (+17.2%) and gloves (+56.7%) was strongest in the coping phase (April and May).

period included disinfectants and sanitizers (+95.9%) and soaps and hydroalcoholic gels (+1687.4%). The share of essential para-pharmaceutical goods increased during the coping period (April–May). Online sales of personal care and well-being goods also increased significantly over this same period. Product families with Year-over-Year growth above 50% across April and May include the "Organic and natural "(+51%), "Hair care" (+60%), "Body care" (+68%), "Makeup and perfume" (+50%) and "Face care" (+64%) families. Veterinary products also experienced significant growth in online sales over April and May (+189%). This growth was driven by sales of products for cats (+164.2%), dogs (+198.5%), and exotic pets, such as rabbits, rodents, ferrets, birds, and reptiles (+165.7%).

4.2.3. Online search terms at CyberPharma

The growth in search terms used by website visitors confirms these temporal trends (see Table 4, strongest growth in bold). During the reacting phase (March), website visitors searched for products to limit the health threat such as hydroalcoholic gel (+58.9%), thermometers (+18%), gloves (+32%), paracetamol (7.5%) and hydroxychloroquine (+7305.5%).

Customers also modified their buying behaviour during the pandemic by reordering more regularly. The percentage of customers reordering in the months following their first order is reported in Table 5.

We note that there was an increase in reorders staring in February that became more pronounced in March and April. For example, customers recruited in April purchased more online in May (+2.8%), June (+1.1%) and July (1.0%) compared to the same period the previous year. This year-over-year difference remains positive but falls in May and June, raising the question as to whether customers will continue new behaviours during the adapting period.

In July 2020, the Head of Data Analytics noted that more time was need to confirm this trend:

> "The reorder rate has gone down a bit, but not to where it was before. I think it's still a bit early to conclude on this, for me at least until the end of September." HDA, 22/07/20

CyberPharma also saw a subtle shift in customer profiles during the pandemic. Table 6 presents the year-over-year change in demographic profiles measured by age bracket and gender.

Across the six-month period, the number of older customers increased to the detriment of younger customers. This trend was pronounced across all three phases (reacting, coping and adapting) for the "over 65" age bracket.

4.3. Pattern matching

Following our literature review, the expected pattern of behaviour was that consumers first reacted to the perceived threat of the pandemic, then coped by adopting new behaviours and exerting control in other areas, and finally adapted their consumption habits to the new normal.

We observed the presence of these three distinct phases in both the evolution of sentiment and in various purchasing behaviours during the period.

During the reacting phase (March 2020), the average number of products and value per order increased and peaked before falling from April to July. This result is consistent with our expectation that consumers would engage in unusual purchasing behaviour in possible reaction to the uncertainty of future product availability. The strongest year-on-year growth in sales of disinfectants, santizers, soaps and hydroalcoholic gels was also observed during this phase, and website searches for products to limit the health threat saw exceptional month-on-month growth in March. These results match the expectation that consumers would increase their purchases of disinfectants and sanitizers during a health crisis to allay sanitary concerns.

During the coping phase (April and May), consumers were expected to cope with the crisis by adopting new behaviours and exerting control in other areas. This pattern was firstly observed in strong year-on-year growth in sales and website searches for essential para-pharmaceutical "problem focused" goods such as disinfectants and protective equipment. Secondly, the strong year-on-year growth in sales of "emotion focused" products including organic and natural, hair, body and face care categories matched the expected pattern that consumers would focus on themselves to take their mind away from the problem.

During the adapting phase (June–July), consumers were expected to become less reactive and adapt their consumption habits to the new normal. The observations partially matched this pattern. Firstly, reacting and coping behaviours, such as purchases of protective and well-being products did fall by the months of June and July, consistent with the expectation that consumers would be less reactive in the adapting phase. The increase in the percentage of older customers purchasing online and reordering rates during the three phases of the

Table 5
Year-over-year percentage change in reorders by month.

	Month of first order					
Reorder delay	**Jan**	**Feb**	**March**	**April**	**May**	**June**
1 month	-0.3%	0.4%	1.4%	2.8%	0.7%	0.2%
2 months	0.4%	0.3%	0.9%	1.1%	0.9%	
3 months	-0.3%	0.3%	0.0%	1.0%		

Legend

+ -	<0.5% change
+	0.5-1% change
+	>1% change

Table 6
Year-over-year percentage change in customer profiles.

Age bracket	Jan-Feb	March	April-May	June-July
18 to 24	-1.1%	-1.8%	-0.7%	-0.6%
25 to 34	-1.3%	-1.6%	-2.1%	-1.9%
35 to 44	0.1%	-0.1%	0.1%	-0.3%
45 to 54	0.8%	0.0%	0.0%	0.3%
55 to 64	0.7%	0.7%	0.7%	0.8%
over 65	0.8%	2.9%	2.0%	1.7%
Gender				
Female	-0.1%	0.1%	1.1%	1.0%
Male	0.1%	-0.1%	-1.1%	-1.0%

Legend

+	-	<0.5% change
+	-	0.5-1% change
+	-	>1% change

Table 7
Results of the pattern matching process by response stage.

Stage	Expected pattern	Observed pattern	Result
Reacting March 2020	Consumers react to the perceived threat of the pandemic and attempt to regain control of lost freedoms. They engage in unusual purchasing behaviours, such as product hoarding and increase purchases of disinfectants and sanitizers to allay health concerns.	Increase in the average number of products per order. Growth in sales of disinfectants, santizers, soaps and hyroalcoholic gels.	Match
Coping April–May 2020	Consumers begin to cope by adopting new behaviours and exerting control in other areas. They purchase products to make life less stressful and well-being goods to take their mind away from the problem. They also seek out social connectedness with other living beings.	Growth in sales of face masks, gloves, protective equipment, disinfectants and sanitizers and soaps and hydroalcoholic gels. Growth in sales of organic and natural, hair, body and face care, and makeup and perfume categories. Growth in sales of veterinary products.	Match
Adapting June–July 2020	Consumers become less reactive and adapt their consumption habits to the new normal. They continue buying online as it allows them to overcome the stress imposed by new sanitary rules and regulations in retail outlets. Late adopters also continue using e-commerce.	Fall in purchases of protective goods and disinfectants. Increase in the percentage of customers reordering in the months following their first order. Change in customer profiles during the three phases towards the "over 65" age bracket.	Partial match

crisis also match the expected pattern of modified consumption behaviours. However, these increases were smaller following the confinement period (June) making it difficult to conclude whether these changes were permanent. More data is needed to verify whether behaviours durably changed in the third phase of the crisis.

Table 7 resumes the results of the pattern matching process by response stage.

5. Discussion

The objective of this study was to improve our understanding of how online purchasing behaviours evolve during life-changing events, such as the COVID-19 crisis. The descriptive case study design sought to explore underlying behavioural motivations and causal mechanisms. Our results have several theoretical and managerial implications.

5.1. Theoretical and managerial implications

Based on an environmentally imposed constraints perspective, we posited that online consumer shopping behaviour reflects actions taken to react to, cope with, and adapt to a crisis. Based on data collected during the COVID-19 pandemic, the results provide overall support for our research proposition and support the usefulness of the react-cope-adapt framework in describing e-commerce behaviours in times of crises.

Our results also suggest extensions to the RCA framework, including different types of online coping strategies based on the work of Lazarus and Folkman (1984). We notably found that online consumers engage in both problem-oriented and emotion-oriented coping behaviours. Online purchases of essential para-pharmaceutical items increased during the adapting phase, which corresponds to a problem-focused coping strategy where purchases address the health situation directly or allow buyers to adjust to the situation by making life less stressful. Online purchases of personal care and well-being goods during the coping phase showed that emotion-focused coping strategies were also at work during the pandemic for some consumers. Year-over-year growth in purchases of organic and natural products, such as cosmetics, gemmotherapy, herbal medicines, essential oils, and aromatherapy, as well as personal hair, body and face care, makeup, and perfume, may be explained by a desire for some consumers to take one's mind away from the COVID-19

situation. Our results extend the RCA framework and contribute to the e-commerce literature by demonstrating that stressful life events such as a pandemic may produce online purchasing behaviours as part of problem-focused and emotion-focused coping strategies.

Our study also contributes to the growing body of research on online "unregulated buying" such as impulse, unplanned, and compulsive buying (LaRose, 2001). Little research has explored the relationship between online purchasing and hoarding. We have learned that individuals first reacted to the pandemic by purchasing products that would help limit the health threat, such as disinfectants and hydro-alcoholic gels. The increase in the average number of items per order during the month of March may indicate that consumers engaged in unusual purchasing behaviour such as the hoarding of essential para-pharmaceutical goods. While this behaviour was observed anecdotally throughout the pandemic (Kirk and Rifkin, 2020; Sheth, 2020), the use of this e-commerce statistic (average items per order) to detect it online is novel. Further research could explore how online shopping influences hoarding behaviours.

Our results have several implications for management. Firstly, the RCA model implies patterns of buying behaviour throughout a crisis that have implications for product assortments and marketing campaigns. Online retailers can anticipate changes in behaviour during such crises and adapt accordingly. Secondly, product offers and promotions can be tailored to problem-based and emotion-based coping strategies. Finally, online retailers and their supply chain partners can also use the RCA model to fine-tune stock management within the supply chain during such a crisis, and thus limit product shortages akin to those reported during the reacting phase of the COVID-19 pandemic.

5.2. Limitations and future research

The results of this study should be interpreted in light of several limitations. Firstly, this study was descriptive in nature and the research propositions should now be tested with an explanatory research design. Secondly, we only used data from one company. Although para pharmaceutical and healthcare products cover some essential and discretionary needs and allowed us to sketch a rich picture of behaviour during the pandemic, future research could complete the picture of online purchasing behaviours by studying other product categories. Thirdly, online transactions were not associated with customer data, making it impossible to verify if a buyer's profile influenced purchasing behaviours. Fourthly, the time period following orders made after the lockdown period may have been too short to detect adaptive behaviours. Further research could observe online purchasing behaviours over a longer time period.

6. Conclusion

Our study builds on the consumer behaviour literature, emerging COVID-19 research, and the environmentally imposed constraints perspective to describe the online behaviour of new and existing customers of a leading French healthcare e-commerce site. We found that online consumers react, cope with, and then adapt to such stressful life events, thus validating the usefulness of the react-cope-adapt framework of constrained consumer behaviour in an online environment. Our results are mainly of use for online and local retailers to adjust their promotion, assortment, and distribution strategies to better deal with such stressful events in the future, and as a starting point for scholars to build causal theories of consumer behaviour during such times of crisis.

References

Almutairi, A.F., Gardner, G.E., McCarthy, A., 2014. Practical guidance for the use of a pattern-matching technique in case-study research: a case presentation. Nurs. Health Sci. 16 (2), 239–244.

Arora, N., Pflumm, S., Rodriguez, L., Robinson, K., Bhargava, S., Charm, T., Tormo, S., 2020. Survey: US Consumer Sentiment during the Coronavirus Crisis. https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/survey-us-consumer-sentiment-during-the-coronavirus-crisis.

Balech, S., Benavent, C., Calciu, M., 2020. The First French COVID19 Lockdown Twitter Dataset arXiv preprint arXiv:2005.05075.

Barnes, S.J., 2020. Information management research and practice in the post-COVID-19 world. Int. J. Inf. Manag. 55, 102175.

Bickman, L., Rog, D.J., Hedrick, T.E., 2009. Applied research design: a practical approach. In: Handbook of Applied Social Research Methods, 2, pp. 3–43.

Carver, C.S., Scheier, M.F., Weintraub, J.K., 1989. Assessing coping strategies: a theoretically based approach. J. Pers. Soc. Psychol. 56 (2), 267.

Clark, D., 2018. Alibaba: the House that Jack Ma Built. HarperCollins Publishers.

Desson, Z., Weller, E., McMeekin, P., Ammi, M., 2020. An analysis of the policy responses to the COVID-19 pandemic in France, Belgium, and Canada. Health Pol. Technol. 9 (4), 430–446.

Diouris, P.L., 2020. Coronavirus. Au Mans, les animaleries s'adaptent à la crise. Le Maine libre. https://www.ouest-france.fr/sante/virus/coronavirus/coronavirus-au-mans-les-animaleries-s-adaptent-a-la-crise-c952219c-70f6-11ea-90c0-16d087144972.

Eroglu, S.A., Machleit, K.A., Davis, L.M., 2001. Atmospheric qualities of online retailing: a conceptual model and implications. J. Bus. Res. 54 (2), 177–184.

Forster, P.W., Tang, Y., 2005. The role of online shopping and fulfillment in the Hong Kong SARS crisis. In: Paper Presented at the Proceedings of the 38th Annual Hawaii International Conference on System Sciences.

Gaur, S.S., Herjanto, H., Makkar, M., 2014. Review of emotions research in marketing, 2002–2013. J. Retailing Consum. Serv. 21 (6), 917–923.

Goldsmith, K., Griskevicius, V., Hamilton, R., 2020. Scarcity and consumer decision making: is scarcity a mindset, a threat, a reference point, or a journey? J. Assoc. Consum. Res. 5 (4), 358–364.

Grassaud, F., 2020. Que se passe-t-il au rayon animalerie à l'heure du Coronavirus? , *France 3 Auvergne Rhone-Alpes*, 24 March 2020. https://france3-regions.francetvinfo.fr/auvergne-rhone-alpes/ain/bourg-bresse/que-se-passe-t-il-au-rayon-animalerie-heure-du-coronavirus-1805518.html.

Hak, T., Dul, J., 2009. Pattern matching. ERIM report series reference No. ERS-2009-034-ORG. website. https://ssrn.com/abstract=1433934.

Hamilton, R.W., Mittal, C., Shah, A., Thompson, D.V., Griskevicius, V., 2019. How financial constraints influence consumer behaviour: an integrative framework. J. Consum. Psychol. 29 (2), 285–305.

Hazée, S., Van Vaerenbergh, Y., 2020. Customers' contamination concerns: an integrative framework and future prospects for service management. J. Serv. Manag.

Islam, T., Pitafi, A.H., Arya, V., Wang, Y., Akhtar, N., Mubarik, S., Xiaobei, L., 2021. Panic buying in the COVID-19 pandemic: a multi-country examination. J. Retailing Consum. Serv. 59, 102357.

Kim, R.Y., 2020. The impact of COVID-19 on consumers: preparing for digital sales. IEEE Eng. Manag. Rev. 1, 1.

Kirk, C.P., Rifkin, L.S., 2020. I'll trade you diamonds for toilet paper: consumer reacting, coping and adapting behaviours in the COVID-19 pandemic. J. Bus. Res. 117, 124–131.

Kruspe, A., Häberle, M., Kuhn, I., Zhu, X.X., 2020. Cross-language Sentiment Analysis of European Twitter Messages Duringthe COVID-19 Pandemic arXiv preprint arXiv:2008.12172.

Laato, S., Islam, A.N., Farooq, A., Dhir, A., 2020. Unusual purchasing behaviour during the early stages of the COVID-19 pandemic: the stimulus-organism-response approach. J. Retailing Consum. Serv. 57, 102224.

LaRose, R., 2001. On the negative effects of E-commerce: a sociocognitive exploration of unregulated on-line buying. J. Computer-Mediated Commun. 6 (3).

Lazarus, R.S., Folkman, S., 1984. Stress, Appraisal, and Coping. Springer publishing company.

Lerner, J.S., Li, Y., Valdesolo, P., Kassam, K.S., 2015. Emotion and decision making. Annu. Rev. Psychol. 66 (1), 799–823.

Liu, D., Liu, A., Tu, W., 2019. The acceptance behaviour of new media entertainment among older adults: living arrangement as a mediator. Int. J. Aging Hum. Dev. 91 (3), 274–298.

Manthiou, A., Hickman, E., Klaus, P., 2020. Beyond good and bad: challenging the suggested role of emotions in customer experience (CX) research. J. Retailing Consum. Serv. 57, 102218.

Mathur, A., Moschis, G.P., Euehun, L., 2003. Life events and brand preference changes. J. Consum. Behav. 3 (2), 129–141.

Mathur, A., Moschis, G.P., Lee, E., 1999. Stress and consumer behaviour: coping strategies of older adults. J. Market. Pract. Appl. Market Sci. 5 (6–7), 233–247.

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

Mohammad, S.M., Turney, P.D., 2013. Crowdsourcing a word–emotion association lexicon. Comput. Intell. 29 (3), 436–465.

Naeem, M., 2021. Do social media platforms develop consumer panic buying during the fear of Covid-19 pandemic. J. Retailing Consum. Serv. 58, 102226.

O'Leary, D.E., 2020. Evolving information systems and technology research issues for COVID-19 and other pandemics. J. Organ. Comput. Electron. Commer. 30 (1), 1–8.

Pejić-Bach, M., 2020. Editorial: electronic commerce in the time of covid-19 - perspectives and challenges. J. Theor. Appl. Electron. Commer. Res. 16 (1), I.

Phillips, M.M., 2020. Wall St. J. https://www.wsj.com/articles/coronavirus-makes-us-upset-puppies-are-coming-to-the-rescue-11586530110.

Plutchik, R., 1982. A psychoevolutionary theory of emotions. Soc. Sci. Inf. 21 (4/5), 529–553.

Plutchik, R., 2001. The nature of emotions: human emotions have deep evolutionary roots, a fact that may explain their complexity and provide tools for clinical practice. Am. Sci. 89 (4), 344–350.

Predmore Carolyn, E., Rovenpor, J., Manduley Alfred, R., Radin, T., 2007. Shopping in an age of terrorism: consumers weigh the risks associated with online versus in-store purchases. Compet. Rev.: Int. Bus. J. 17 (3), 170–180.
Prentice, C., Chen, J., Stantic, B., 2020. Timed intervention in COVID-19 and panic buying. J. Retailing Consum. Serv. 57, 102203.
Punch, K.F., 2013. Introduction to Social Research: Quantitative and Qualitative Approaches. Sage.
Reiter, B., 2013. The Epistemology and Methodology of Exploratory Social Science Research: Crossing Popper with Marcuse. The Dialectics of Citizenship: Exploring Privilege, Exclusion, and Racialization. MSU Press, East Lansing, pp. 1–22.
Richard, M.-O., 2005. Modeling the impact of internet atmospherics on surfer behaviour. J. Bus. Res. 58 (12), 1632–1642.
Sarmento, M., Marques, S., Galan - Ladero, M., 2019. Consumption dynamics during recession and recovery: a learning journey. J. Retailing Consum. Serv. 50, 226–234.
Sheth, J., 2020. Impact of Covid-19 on consumer behaviour: will the old habits return or die? J. Bus. Res. 117, 280–283.
Starosta, K., Onete, C.B., Grosu, R., Plesea, D., 2020. COVID-19 mass media infodemic in six European countries. Advance. https://doi.org/10.31124/advance.13333697.v1 Preprint.
Tran, L.T.T., 2021. Managing the effectiveness of e-commerce platforms in a pandemic. J. Retailing Consum. Serv. 58, 102287.
Trochim, W.M., 1989. Outcome pattern matching and program theory. Eval. Progr. Plann. 12 (4), 355–366.
Verma, S., Gustafsson, A., 2020. Investigating the emerging COVID-19 research trends in the field of business and management: a bibliometric analysis approach. J. Bus. Res. 118, 253–261.
Vieira, V.A., 2013. Stimuli–organism-response framework: a meta-analytic review in the store environment. J. Bus. Res. 66 (9), 1420–1426.
Watanabe, T., Omori, Y., 2020. Online consumption during the covid-19 crisis: evidence from Japan. Covid Econ. 32, 208–241.
Yin, R.K., 2009. Case Study Research and Applications: Design and Methods. Sage publications.