

Consumer emotions and collaborative consumption

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de Medeiros, Janine Fleith; Marcon, Arthur; Ribeiro, Jose Luis Duarte; Quist, Jaco; D'Agostin, Andressa

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Janine Fleith de Medeiros , Arthur Marcon ,
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Consumer emotions and collaborative consumption: the effect of COVID-19 on the adoption of use-oriented product-service systems

Janine Fleith de Medeiros ^{a, b*} (ORCID: 0000-0002-5060-0632);

Arthur Marcon ^a (ORCID: 0000-0003-0334-3853);

Jose Luis Duarte Ribeiro ^a (ORCID: 0000-0002-5795-4468);

Jaco Quist ^c (ORCID: 0000-0002-6365-4082);

Andressa D'Agostin ^b (ORCID: 0000-0002-1611-7081).

^a Graduate Program on Industrial Engineering, Department of Industrial Engineering and Transports, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre (Rio Grande do Sul), Brazil.

^b Graduate Program on Business Administration, Universidade de Passo Fundo, Rodovia BR 285, Km 292,7, S/n - São José, Passo Fundo - RS, 99052-900, Brazil

^c Delft University of Technology, Faculty of Technology, Policy & Management, Postbus 5015, NL-2600 GA Delft.

*Corresponding author:

Janine Fleith de Medeiros. *Email:* janine@upf.br. *Address:* Universidade de Passo Fundo, Rodovia BR 285, Km 292,7, S/n - São José, Passo Fundo - RS, 99052-900, Brazil.

Abstract

The COVID-19 pandemic is expected to widely change how consumers evaluate market offerings. In this research, we identified consumers' emotions on the adoption of use-oriented Product-Service-Systems (PSS) and the effect of COVID-19 on such emotions using pre- and amid-COVID-19 samples. The results indicate that positive emotions are generally more associated with the process of adopting use-oriented PSS. However, the negative effect of COVID-19 on emotions influencing the decision to use the PSS is significant. We found that during the pandemic, consumers moved from the positive side of emotions to the more negative one. The emotions with the highest frequencies in pre-COVID-19 data collection (sympathy, joy, and peacefulness) suffered a significant descent effect due to the pandemic. Also, negative emotions such as fear, shame, and guilt, which were already present in the pre-COVID-19 phase, showed an increase in manifestations in the amid-COVID-19 sample. COVID-19 has increased self-interest in people, and emotions that predict altruism and concern for society were affected. We also found that previous use experience as well as gender and education do not significantly moderate the effect of COVID-19 on consumption emotions, although these demographic variables have been confirmed in other studies as important moderators in pro-environmental consumption. Finally, the results demonstrated that younger people (between 18 and 24 years old) tend to be more impacted by pandemic. Theoretically, our study contributes (1) by using an emotions scale specifically developed for consumption situations, allowing to assess a greater amount of emotions, (2) by analysing basic emotions, in addition to the self-conscious ones, that interfere in the adoption of use-oriented PSS, and (3) by confirming that an external traumatic event alters consumption-related emotions.

Keywords: sustainable consumption; consumption emotion set; Sars-Cov2; pandemic; sharing economy.

Declarations

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The authors declare that there are no conflicts of interest.

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Abstract

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1. Introduction

The COVID-19 pandemic has shocked the world and has significantly affected health, as well as the economic and social spheres (Cohen, 2020; Majumdar, et al., 2020; Sarkis et al., 2020). Studies show that the SARS-CoV-2 virus, which causes COVID-19, is transmitted through

personal contact with contaminated secretions by persons who cough or sneeze, through the inhalation of airborne virus particles, or through contact with a contaminated surface (World Health Organization, 2020). According to recent research, the virus remains alive for up to 24 hours in cardboard packaging and up to three days on plastics and stainless steel (Malik et al., 2020; Uddin et al., 2020). Thus, in addition to social distancing, washing hands and wearing face cover, cleaning environments, and avoiding object sharing are essential practices to prevent infection (Ingrassia et al., 2020). The latter issues posit major challenges to collaborative consumption offerings, such as Product-Service Systems (PSS).

PSS have been related to collaborative consumption (Piscicelli et al., 2015), the sharing economy and are considered a Circular Economy strategy (e.g. Geissdorfer et al., 2018). PSS are defined or described as a business model characterized by the integration of products and services designed to meet consumer needs in a sustainable way, reducing resource consumption and environmental impacts (Annarelli et al., 2016; Qu et al., 2016). Three PSS categories can be distinguished: (i) product-oriented PSS; (ii) use-oriented PSS; and (iii) result-oriented PSS (Tukker and Tischner, 2006)¹. In this paper, the focus is on use-oriented PSS, which are in line with the principles of the sharing economy (Reim et al., 2015).

Use-oriented PSS are grounded on the idea that consumers are not necessarily looking for a material product, but for its usefulness, function, value, or provided service (Qu et al., 2016; Kanda and Matschewskya, 2018). Thus, use-oriented PSS can be understood as a possibility of consumption in which the service provider, who may or may not be the original manufacturer, maintains product ownership, while consumers pay to use it for a predetermined period (Tukker, 2004). Examples of business to consumer use-oriented PSS include bike and scooter sharing services, ride-hailing (or ride-sharing) offers based on smartphone applications, printing solutions where consumers pay based on the number of copies (rather than for the printer), and co-working spaces² (Bouncken et al. 2020). Use-oriented PSS offerings involve renting or sharing objects or even making privately-owned products available to people within a community (Piscicelli et al., 2015). This type of business model is strongly focused on sustainability and a circular economy since it aligns environmental interests with positive social and economic impacts (Tukker and Tischner, 2006; Piscicelli et al., 2015).

Over the last decade niche markets for various PSS have emerged and have been related to the sharing economy (Schorr, 2014) and to sustainable consumption (Piscicelli et al., 2015). These PSS niches are growing quickly, and they are considered as essential for transitions to sustainability and a circular economy in many areas of production and consumption (Frenken and Schor, 2019). However, according to Catulli et al. (2017), Akbar and Hoffmann (2018), and Mashhadi et al. (2019), the adoption rates for use-oriented PSS are still low, and academic studies are needed to increase our understanding of underlying consumers'

¹ In product-oriented PSS the manufacturer provides additional services, such as maintenance and guarantee, in order to assure proper product performance for a predetermined period of time. In use-oriented PSS, the service provider, who may or may not be the original manufacturer, retains ownership of the product and clients pay to use the product and its functions for a predetermined period. Result-oriented PSS, it is focused on a service that replaces a given product (for instance, instead of renting a washing machine, families can have access to a laundromat service) (Tukker, 2015).

² Leasing services are also considered to be use-oriented services, but do generally not allow for sharing and are not part of collaborative consumption practices. Therefore, leasing is left out, as it does not or considerably less affected by the COVID-19 related emotions addressed in this paper

motivations and choices. Moreover, during the COVID-19 pandemic scenario, consumption based on sharing may be associated by consumers with greater contamination risks.

To make things more complicated, consumers are subject to a wide variety of psychological and social needs that are significantly distant from their survival needs (Schiffman and Kanuk, 2014). Emotional elements have an important role in consumers' decision-making processes (Ghorbani et al., 2013), and are crucial for the future of collaborative consumption (Fraanje and Spaargaren, 2019). Nevertheless, studies that address the impact of use-oriented PSS on consumers' emotions are scarce. In this sense, mapping consumers' feelings is of great importance since most studies on pro-environmental behaviour employ the Theory of Reasoned Action (TRA) (Ajzen et al., 1980) or the Theory of Planned Behaviour (TPB) (Ajzen, 1991) as theoretical frameworks, such as the works of Paul et al., (2016), Liobikienė et al., (2016), and Ghose and Vision (2020).

Therefore, consumer behaviour theories that encompass emotions can play a key role in the research regarding decision-making processes for green products (Choi and Johnson, 2019; Jung et al., 2020). They can provide, for example, a greater understanding of the emotional mechanisms that drive non-green consumers into buying or adopting green products (Cheung et al., 2019; Ali et al., 2020). Research investigating emotions in consumer behaviour also tends to make communication practices and even regulatory policies more effective (Preziosi et al., 2019; Beatson et al., 2020). Various brain structures process information and our decision-making process involves both reason and emotion (Sleenhoff et al., 2015). These two systems communicate with each other, impacting behaviour together (Dolan, 2002; Rustichini, 2005). Therefore, the decision-making process cannot be described as exclusively rational and conscious as it is affected by emotional and subjective elements (Zaltman, 2003).

Research indicates that the pandemic has affected our feelings and emotions (Ahorsu et al., 2020; Dymecka et al., 2020; Tull et al., 2020). Moreover, we still do not precisely know whether consumers' emotions related to use-oriented PSS altered due to the COVID-19 pandemic. Research has not addressed the impact of the COVID-19 pandemic on consumers' consumption-related emotions. Therefore, we aim to identify the relationship between use-oriented PSS adoption and consumers' emotions, and the effect of COVID-19 on such emotions. To that end, we raise the following questions, which guided our research: (1) Which consumers' emotions are associated with the decision-making process for the adoption of use-oriented PSS?, (2) Has the pandemic changed consumers' emotions towards use-oriented PSS?, and if so, (3) What is the impact of COVID-19 on consumers' emotions towards use-oriented PSS?

We justify the theoretical validity of our research by the use of a scale specifically developed to investigate consumption emotions. Consumption Emotion Set Scale (CES) presents a broader set of emotions and sentiments compared to scales from psychology, which are usually employed (Cardello and Jaeger, 2016). Furthermore, the analysis of published research on the influence of emotions on pro-environmental behavior shows that the influence of emotions on pro-environmental consumption behavior focuses generally on only one or two self-conscious emotions (Onwezen et al., 2013 and 2014; Piscicelli et al., 2015; Jiang et al., 2020, among others). Hence, this paper advances the scientific literature by analysing whether basic emotions influence consumers' motivations and assessments regarding use-oriented PSS adoption. In addition, long-term behavioural, economic, and social changes tend to occur after the crisis gets controlled (Sarkis et al., 2020). Therefore, increased

understanding of the impact of COVID-19 on use-oriented PSS consumption-related emotions is important for researchers, when studying the rise of collaborative consumption (Echegaray, 2021).

Methodologically, this study can be characterized as descriptive (Malhotra, 2009), with a multiple transversal approach since our data derive from two distinct sample collections (one prior to the existence of COVID-19 and one amid the COVID-19 pandemic). Structurally, section 2 presents the theoretical background and hypotheses. Section 3 describes the method of data collection and analysis. The results are covered in section 4. Section 5 discusses the implications of the results obtained. Finally, section 6 summarizes the conclusions, research limitations and suggestions for future studies.

2. Theoretical Background and Hypotheses

2.1 Emotions and Consumer Behaviour

Consumer behaviour research shows that emotions play an important role in consumer decision-making processes, as well as in developing and maintaining preferences for specific products, both goods and services (Zaltman, 2003; Shiv, 2007; Kenrick et al., 2013). Essentially, consumers tend to like or regret their choices (Oliver, 1994). Moreover, individuals tend to associate deep feelings like happiness, fear, love, hope, pride, sadness, or fantasy, with certain purchases or product usage (Holbrook and Hirschman, 1982; Pham et al., 2001). Therefore, affective responses influence processes, such as assessment, memory, judgment, and risk perception (Gardner, 1985; Dolan, 2002; Rustichini, 2005).

Research by Carrus et al. (2008), Swim et al. (2011), and Menzel (2013) identified that emotions play an important role in choosing green offerings. Similarly, Meneses (2010) found that sustainable consumption is more correlated with emotions than with cognition. According to Harth et al. (2013) and Wang and Wu (2016), an emotion may predict specific types of pro-environmental behaviour. Most existing studies on the theme focus primarily on emotions such as guilt and pride, which are self-conscious emotions³.

Onwezen et al. (2013 and 2014), and Antonetti and Maklan (2014a and 2014b) found that guilt and pride tend to be relevant emotions to motivate the choice for green products. Onwezen et al. (2013) confirmed that anticipated pride and guilt are emotions with a self-regulatory function that mediate the effects of personal norms on behaviour. Antonetti and Maklan (2014a and 2014b) found that feelings of guilt and pride can regulate sustainable consumption by affecting consumers' general perception of effectiveness. Interestingly, Kim et al. (2013) and Peloza et al. (2013) state that the preference for a product promoted through ethical appeals is motivated by the desire to avoid anticipated guilt. Theotokis and Manganari (2015) examined the architecture of choice between on the one hand options in which green services need to be requested (opt-in), and on the other hand options in which green services are implicit (opt-out). In this case, opt-out options are more effective, as they increase consumers' anticipated guilt. For Jiang et al. (2020), anticipated guilt has a positive and direct impact on the intention of low-carbon consumption behaviour. Liang et al. (2019) found that positive emotions like pride and gratitude are related to pollution prevention and green

³ Those emotions that involve relationships between the individual and the other, since guilt, pride and shame (Lagattuta and Thompson, 2007).

purchase intent. By contrast, negative emotions like guilt and condemnation of others are only related to the intention to buy green products. In addition, Amatulli et al. (2019) identified that messages with negative framing are more effective than messages with positive framing to encourage individuals to engage in pro-environmental behaviours. Anticipated shame is the emotion responsible for this effect.

Although self-conscious emotions are ideal predictors of moral behaviour like in sustainable consumption, while basic emotions like joy, anger, and fear also affect consumers' green decision processes (Kolling et al, 2020; D'Agostin et al., 2020b). According to Harth et al. (2013), in a study investigating the emotion of anger, responsibility within the group for environmental damage tends to increase anger, driving intentions of punishment. Wang and Wu (2016) also confirmed that anger, in addition to pride, guilt, and respect, interferes with significant choices in sustainable consumption. Hwang and Kim (2016) found that joy can motivate the purchase and repurchase of environmentally sustainable products, not out of empathy but out of narcissism. Singh et al. (2018) assessed the effect of fear and anger on consumers' ethical judgment and found that people in the state of incidental fear exhibit higher levels of ethical judgment than individuals in the state of incidental anger. For Dong et al. (2018), the love of possession and individuals' materialism positively affects the sustainable consumption behaviour of durable products. Kolling et al. (2020) mapped out that sympathy (for those who buy green products), pride (for buying green products), and joy (for knowing that green products are available) were the emotions most associated with purchasing green products. D'Agostin et al. (2020b) identified that envy, guilt, frustration, and concern are feelings associated by young people when they must use disposable cups.

Regarding the study of emotions in the context of the use-oriented PSS, previous results indicate the positive and the negative influence of emotions throughout consumers' adoption processes, although no studies have addressed this issue. Nevertheless, Piscicelli et al. (2015) state that guilt favours use-oriented PSS adoption. Armstrong et al. (2015), Catulli et al. (2017), Akbar and Hoffmann (2018), and Mashhadi et al. (2019) emphasize that altruism and social awareness tend to motivate the adoption of use-oriented PSS. By contrast, Akbar and Hoffmann (2018) identify that the fear of non-ownership, and consequent lack of exclusivity, increases resistance to use-oriented PSS adoption. Other authors have also found that feelings of ownership associated with different products tend to increase consumers' resistance to the adoption of use-oriented PSS (Piscicelli et al., 2015; Tukker, 2015; Annarelli et al., 2016; Schmidt et al., 2016; Catulli et al., 2017, among others). Finally, the disbelief about the benefits that shared use generates for the environment, society and the economy (Kristensen and Remmen, 2019), shame (not knowing how to use the product) (Schmidt et al., 2016), and insecurity (Schorr, 2014; Catulli et al., 2017) may inhibit the adoption of use-oriented PSS.

Figure 1 summarizes the main conclusions of subsection 2.1. Although studies have been carried out, there is still a limited view of emotions and their relationship with decision-making behaviours related to environmentally sustainable consumption.

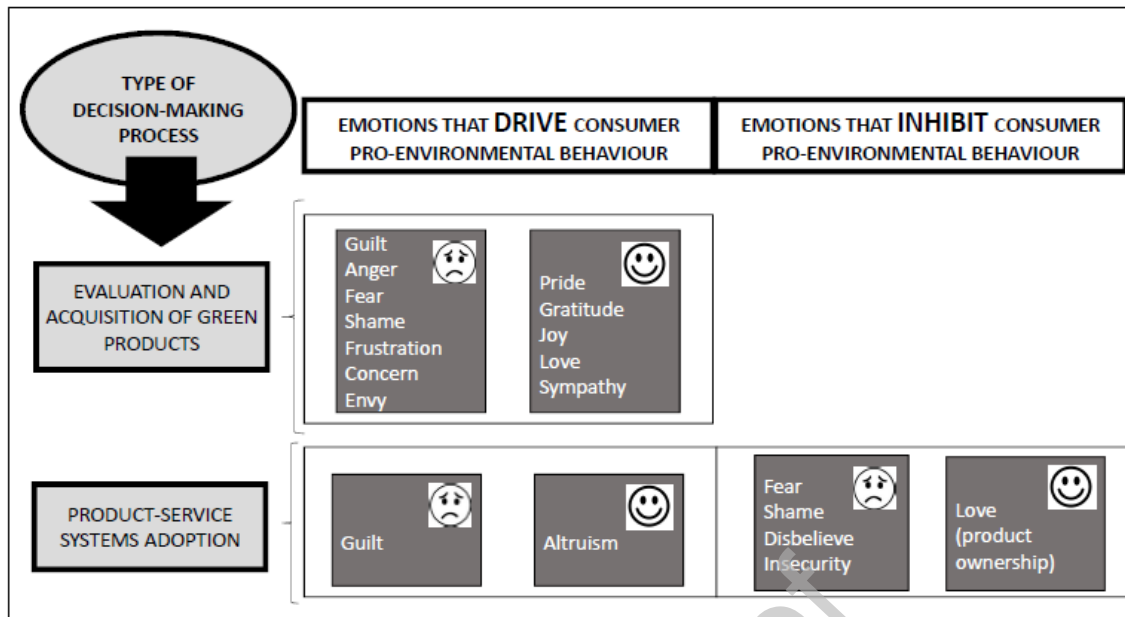


Figure 1 – Summary of previous literature findings

2.2 Assessing Emotions in Consumer Decision Processes

Although the Theory of Planned Behaviour (TPB) (Ajzen, 1991) is relevant for the study of pro-environmental behavior, it has limitations (Kim et al., 2013; Jiang et al., 2020). For instance, TPB does not consider emotions that play an important role in behavioural intention and attitude (Menzel, 2013; Bangsa and Schlegelmilch, 2020). This results in a limited reflection of reality, since it describes and characterizes consumer behaviour as predominantly cognitive (Araña and Leon, 2009).

Theoretically, several conceptual explanations for the term “emotions,” their formation and decoding processes have been proposed. In this sense, according to Erevelles (1998) and Watson and Spance (2007), two theoretical streams are commonly addressed in consumer behaviour to defend the origin of emotions: one that favours the cognitive-affective process (cognitive theory) and another one proposing that affection and cognition can occur separately (independence theory).

The present study follows the concepts related to the cognitive theory of emotions. This is especially supported by results from the study of Anand et al. (1988), where the comparison between the two theoretical approaches supports the cognitive-affective model over the independence model. Also, it is justified on the fact that the cognitive-affective model is more prominent nowadays, for instance (Ruth et al., 2002; Gaur et al., 2014; Achar et al., 2016).

According to the cognitive theory of emotions, the occurrence of an emotion depends on the cognitive interpretation of a physiological state (Lazarus, 1991). Therefore, the situation's cognitive assessment determines which emotion must be experienced (Derbaix et al., 2012). Specifically, regarding consumption, emotions can be described as affective responses caused by the experience lived (Holbrook and Gardner, 2000; Achar et al., 2016). Emotion concerns a mental state of readiness from cognitive appraisals of situations or thoughts (Bagozzi et al., 1999). Emotions are similar to a cognitive system, which results from

the analysis made by individuals of the significance of a given event on their wellbeing (Ruth et al., 2002; Koshkaki and Solhi, 2016).

Considering the metrics used to assess emotions in consumer behavior, some studies use scales derived from psychology (Cardello and Jaeger, 2016). Nevertheless, the psychology-originated scales are not prepared to analyse emotions related to purchase decision processes (Lichtlé and Plichon, 2014). Therefore, in the present study, we choose to use the Consumption Emotion Set (CES) Scale as our reference. The CES scale was developed by Richins (1997), and its specific aim is to measure consumption-related emotions. It includes a set of descriptors representing the emotions that individuals most often experience during the purchase and consumption of different types of products. It is composed of 47 emotion descriptors, distributed in 17 factors (see Annex A).

The CES list of factors and descriptors contemplates both positive and negative emotions. In fact, in studies regarding the structure of feelings, the distinction between positive and negative emotions constantly emerges as the two dominant and relatively independent dimensions (Watson et al., 1988; Gaur et al., 2014). Positive emotions are those associated with reaching objectives (those that involve attraction, approximation, or positive behaviour), whereas negative emotions result from eventual failures or problems, comprising escape, retreat, or negative behaviour (Pham, 1998; Bagozzi et al., 1999; Duhachek, 2005).

Although other scales have been developed afterward (Honea and Dahl, 2005; King and Meiselman, 2010; Lichtlé and Plichon, 2014), CES has the most comprehensive structure to measure emotions throughout the purchase and consumption experiences (Laros and Steenkamp, 2005; de Medeiros et al., 2010). This conclusion is justified since CES elaboration observes the identification of emotion descriptors that are familiar and readily understood by consumers. Additionally, CES applicability range that covers distinct purchasing processes. Therefore, we believe that CES's use will enable the identification of emotions related to the adoption of use-oriented PSS in a more comprehensive, appropriate, and holistic way.

2.3 Research Hypotheses

Studies prior to the COVID-19 pandemic indicated that sanitary issues could inhibit the adoption process for use-oriented PSS. For instance, Armstrong et al. (2015) identified that hygiene-related aspects could limit consumers' adherence to business models focused on clothing sharing. According to Edbring et al. (2016), the hygiene concern was one of the motivators for collaborative consumption to increase acceptance of rarely used products. In the COVID-19 scenario, in which attention should be paid to cleaning shared spaces and objects (Ingrassia et al., 2020), this feeling of concern may increase in the processes of consumer adhesion to use-oriented PSS.

Research has also identified other negative emotions related to the adoption of use-oriented PSS, such as insecurity and fear. Regarding insecurity, Schorr (2014) pointed out that one of the common drivers among people who adhere to sharing offers is the desire to increase social connections. However, many tended to feel insecure and disappointed since the transaction parties often do not know each other due to remote access (such as car sharing, for example). For Catulli et al. (2017), using consumer culture theory, the adoption of use-oriented PSS is hindered by insecurity since we usually do not know the subjects with whom we will share the offer. In addition, Marko et al. (2020) highlight that the exposure that everyone has to the effects and risks arising from COVID-19 increases the effects on our

mental health, further deepening the feelings of uncertainty that tend to trigger generalized insecurity.

Ahorsu et al. (2020) highlight that the proliferation of COVID-19 tends to increase people's feelings of fear. These authors point out that due to the disease's infectious nature, fear tends to be manifested, leading to other psychosocial challenges, such as stigmatization and discrimination. Yang et al. (2018) found that fear generated by infectious diseases motivates people to protect themselves and produces negative bio-social-psychological effects. In their research carried out after the World Health Organization declared a global health crisis due to the Zika Virus, the interviewees (women of childbearing age), reported being afraid at levels similar to those reported after other crises or significant disasters (such as the 9/11 terrorist attacks). These findings suggest that the COVID-19 pandemic (as a global health crisis) may negatively impact consumers' emotions to consumption too.

Regarding negative emotions, Kim and Cameron (2011), conducted an experiment that investigated people's emotional response to a corporate crisis (a cell phone explosion accident), and confirmed that consumers experience anger and sadness in such situations. Vázquez and Hervás (2010) found that feelings of anger were unleashed in the population after the terrorist attacks of March 11, 2004 in Madrid. Li et al. (2017) point out that there are different emotional responses (for example, anxiety and anger) to an unexpected event and its sub-events, for which the researchers analysed the behaviour of people on social media after the Japanese earthquake in 2011, the earthquake in Haiti in 2010 and during the H1N1 pandemic in 2009.

Other studies indicate that in addition to negative emotions, positive emotions can emerge and motivate actions in crisis situations. According to Kim and Niederdeppe (2013), in a study with students at a university that suffered an outbreak of H1N1, positive emotions were more present than negative emotions. According to these authors, feelings like satisfaction and fulfilment (among those who helped with the crisis management work), as well as calm and hope, were verified. Similarly, Vázquez and Hervás (2010) also found a range of positive emotions after the terrorist attacks of March 11 in 2004. Among such feelings, the authors highlight strength, excitement, pride, and joy.

Finally, in light of the previous findings addressing emotions after negative events, and given the shared nature of use-oriented PSS, the COVID-19 pandemic crisis is expected to have changed how consumers relate emotionally to this type of consumption, mainly due to the transmission characteristics of the disease. Hence, we propose the first research hypothesis as:

H1 – Consumers' emotions towards use-oriented PSS have changed due to the COVID-19 pandemic.

The relationship between emotions, perceived risk, and past experiences must be considered (Blackwell et al., 2011). Conceptually, perceived risk covers the fundamental issues of "uncertainty" and "consequences" (Bauer, 1960; Cox, 1967; Bateson, 1995). Consumer risk requires the existence of uncertainty regarding the results of possible actions (Yates, 1992). Schiffman and Kanuk (2014) summarize six types of perceived risks addressed in the literature,

with their degree of importance alternating due to the type of product purchased: (i) financial - loss of money through the comparison between the total perceived value and the total perceived cost; (ii) physical - problems associated with the health or safety of consumers during purchase or consumption; (iii) social - consumers' perception of how others will react to their consumption; (iv) performance - refers to functionality, how well the product will perform the necessary technical functions; (v) psychological - how consumers perceive themselves after purchasing in terms of self-image and self-concept or insecurity; and (vi) time - the possibility of a decision-making process taking too long or resulting in a loss of time.

In the purchase of environmentally sustainable products, studies have identified that consumers mainly perceive risks of performance (Ewing and Sarigöllü, 2000; Jena and Sarmah, 2015; de Medeiros et al., 2016). According to Luchs et al. (2010), when functional attributes are decisive for consumers' decisions, the preference for environmentally sustainable offers is reduced. In studies that investigated the adoption of use-oriented PSS, in addition to the issue of performance results of Piscicelli et al. (2015), Schulte and Voß, (2015), Annarelli et al. (2016), and Akbar and Hoffman (2018), papers also address the psychological risk due to uncertainty. Additionally, Armstrong et al. (2015) and Edbring et al. (2016) identified the perception of physical risk related to sanitary issues.

However, studies carried out in different segments indicate that positive experiences reduce perceived risk and favour repurchase (Mittal et al., 1998; Snoj et al., 2004; Tavitiyaman and Qu, 2013). This mainly occurs when individuals perceive additional value (Sweeney et al., 1999; Kumar et al., 2010). For example, Liang et al. (2018) discovered that when searching for repurchase intentions associated with a product resulting from the sharing economy, perceived value positively increases intention to repurchase. Additionally, Lin and Chan (2019) found that more frequent users of sharing platforms have less security and performance uncertainty. Huarng and Yu (2019) found that while traditional hotels outperform Airbnb in terms of services hosting, experiences, and satisfaction, Airbnb generates much higher perceived value than hotels, making the satisfaction achieved reduce all the risks that were associated with the choice of initial purchase.

In stress contexts, a study by Sönmez and Graefe (1998) found that positive feelings related to previous trips tend to decrease risk perception for future trips, even if such trips are to unsafe regions. Batra et al. (2012) identified that positive emotional connection, trust, passion, suffering predicted by separation, and long-term relationship predict consumer resistance to negative episodes with brands or consumer objects. Floyd et al. (2004) examined the relationship between perceived risk and travel intentions of New York residents right after 9/11 and found that positive past experiences reduced risk perception and negative emotions. Therefore, both the results of Sönmez and Graefe (1998), Batra et al. (2012), and Floyd et al. (2004) provide evidence of the effect of consumers' previous consumption experience on their emotions. Concerning the effect of COVID-19, Matiza (2020) identified that consumers tend to perceive less risk in domestic than international travel. According to the author, individuals feel safer "inside" what they are more familiar with, reducing the perception of psychological, social, and physical risk.

Based on previous studies regarding emotions on consumption and consumers' previous experience, we assume that consumers are already used to consuming use-oriented PSS tend to be less affected in emotions and feelings related to consumption during the pandemic. In other words, we theorize an interaction effect between previous experience with

PSS and COVID-19 on consumers' emotions. Therefore, our second research hypothesis posits that:

H2 – The effect of previous consumption of (or experience with) use-oriented PSS offerings on consumers' emotions is moderated by COVID-19.

Since personal factors, such as gender, age, and education tend to interfere with consumers' decision-making processes (Solomon, 2014), we believe it is important to assess their impact on consumers' emotions when moderated by the COVID-19 pandemic. Therefore, a point to be investigated focuses on the difference in behaviour between genders. The division between the genders is normal, natural, and inevitable (Bourdieu, 2016). The author describes that the division is objectively presented in things (as in the house, where the parties are sexed) and throughout the social world. In the marketplace, gender has always been a differential segmentation variable, with gender identity being a very important component of the subject's self-concept as a consumer (Solomon, 2014).

According to Baudrillard (1998), in the consumer society, the object itself is never consumed. Instead, objects are manipulated as signs that distinguish individuals. From the perspective of gender, Baudrillard (1998) points out that, in consumption, the male model is the requirement and choice, while the female model describes the need for "with pleasure". Underhill (2009) highlights that even today, after the consolidation of the feminist movement, women continue to prioritize the valuing of community goals (such as affiliation and the promotion of harmonious relationships), while men prioritize individual goals (which emphasize self-assertion and dominance).

For pro-environmental behaviour, a series of surveys allows us to generalize that women are more likely to buy sustainable (green) products and to participate more frequently in other actions that demand behaviour change (for example, recycling and conservation of energy and resources) (Mostafa, 2007; do Paço et al., 2009; Chekima et al., 2016). By contrast, men tend to have greater knowledge about environmental issues than women (Straughan and Roberts, 1999; Boztepe, 2012). Besides, women tend to more carefully consider the impact of their actions on others (Eagly, 1987) and are therefore more likely to maintain attitudes consistent with the environment (Mostafa, 2007; Chekima et al., 2016). Analysing gender differences in the adoption of use-oriented PSS, D'Agostin et al. (2020a) found that the gender effect is significant on drivers. Specifically, variables associated with a sustainable and healthy lifestyle and the compatibility between values and availability tend to influence women more than men.

Regarding traumatic situations, Lin et al. (2011) and Suresh et al. (2011) identified that the adherence of women to the H1N1 vaccination in the post-pandemic period was significantly higher than that of men. This finding may suggest a difference in behaviour during pandemic experiences among genders. Furthermore, González-Sanguino et al. (2020), in a study that reported the psychological impact of COVID-19 in a sample of the Spanish population, identified that women manifested more symptoms associated with depression, anxiety, and post-traumatic stress (PTSD) than men. Additionally, Bodecka et al. (2021), when assessing the moderating role of gender in the relationship between the hedonistic perspective of the present time and the development of depressive symptoms and stress

during the period of restrictions imposed by COVID-19, confirmed that the contemporary hedonistic perspective would correlate negatively with psychological suffering in women, but positively in men.

In sum, the effect of gender is expected to interact with the COVID-19 pandemic to consumers' emotions related to the use-oriented PSS. In other words, the impact of COVID-19 on consumers' emotions is expected to depend on the consumer's gender. Thus, our third research hypothesis proposes that:

H3 – The COVID-19 pandemic moderates the impact of gender on consumers' use-oriented PSS emotions.

Concerning age, many studies that investigate environmentally sustainable purchasing behaviour explore this demographic variable as an alternative to more effectively identify target segments (Zhao et al., 2014; Yadav and Pathak, 2016). Most of the time, solutions to environmental problems are a threat to changing values and behaviours, and it is natural for younger people to support and accept ecological ideologies more easily than older people (Straughan and Roberts, 1999). Although there is no consensus yet, many studies state that younger people (especially millennials and Z generations⁴) are more sensitive to environmental issues than older people, while also inclined to a more sustainable lifestyle (de Medeiros et al., 2016; Lago et al., 2020). Consumer trends survey indicate that 65% of generation Z want to know the origin of the product they intend to buy, while 75% of millennials expect sustainable actions from organizations (ABIHPEC/SEBRAE, 2019).

Younger generations are presented to ecological awareness and knowledge at an early age (Gan et al., 2008; Mahesh and Ganapathi, 2012). Regarding the sharing economy, there is a growing consensus that the millennials adopted the mindset that access to goods and services is more valuable than ownership, although awareness-raising communications are still relevant (Godelnik, 2017). In the process of use-oriented PSS adoption, research identifies that young consumers are more informed (D'Agostin et al. 2020a), engaged, and concerned (Sands et al., 2020). Still on the age variable, Armstrong et al. (2015) concluded that PSS schemes with experiential, innovative, and social approaches (for example, rent, exchange, and fashion results) are perceived as ideal for younger consumers, while services that emphasize product satisfaction (redesign, repair/maintenance, customization, consulting) are perceived as more suitable for older consumers.

After discussing the differences between younger and older people in terms of pro-environmental behaviour, we must also consider the differences between the youngest and the oldest in the face of COVID-19. Norris (1992), in a study that examined the impact of 10 traumatic events, found that the age factor was decisive for post-traumatic stress disorder (PTSD), with the greatest impact on younger people. Also, Amir and Sol (1999) identified that exposure to one type of traumatic event increases psychological distress, while exposure to various types of traumatic events is associated with decreased suffering. This fact helps us to understand why more mature people tend to experience fewer negative emotions than younger people in such situations. Losada-Baltar et al. (2020) found that younger women more

⁴ Generation Y corresponds to people born between 1980-2000, and Generation Z encompasses consumers born between 2000-2010 (Kotler et al., 2014).

strongly expressed anguish, suffering, and loneliness during the outbreak of COVID-19. The elderly, with positive self-perception of aging, showed greater resilience in the face of the pandemic. Additionally, being in a more advanced age group, having economic stability, and believing that adequate information was provided about the pandemic are negatively related to depression, anxiety, and PTSD in Spanish people who experienced COVID-19 (González-Sanguino et al., 2020).

Given the above and knowing that consumers who are more involved with certain decision-making processes tend to link emotions to those processes (Blackwell et al., 2011), we consider that the pandemic's effects are expected to be higher on young consumers' behaviour. In other words, COVID-19 is expected to have impacted young consumers' emotions to a higher extent than other age groups. Therefore, our fourth hypothesis is:

H4 - The COVID-19 pandemic moderates the relationship between consumers' age and their emotions towards use-oriented PSS adoption. Therefore, young consumers' emotions are expected to be more affected by the pandemic than other age groups.

Finally, the effect of education level on consumers' emotions may also be moderated by the impact of COVID-19. Pioneering studies of people who are more likely to engage in pro-environmental behaviours have indicated higher education levels as relevant influencing variables (Anderson and Cunningham, 1972; Cornwell and Schwegler, 1992; Straughan and Roberts, 1999). Other studies also positively correlate higher educational levels with greater environmental concern and ecologically correct behaviour (Gan et al., 2008; Chekima et al., 2016; de Medeiros et al., 2016).

Focusing on the use-oriented PSS adoption process, Moro et al. (2018) found that residents of big cities, with a higher educational level, tend to be more motivated to use shared bicycles. The understanding that, by adopting PSS, individuals can contribute to the reduction of emissions is a recurring driver related to the cultural background (Edbring et al., 2016; Estrada et al., 2017; Kristensen and Remmen, 2019). Other studies have mapped out that consumer beliefs and culture could inhibit and hinder the adoption of use-oriented PSS (Annarelli et al., 2016; Catulli et al., 2017; Yin et al., 2018). Additionally, knowledge about the process of adopting PSS tends to favour adoption behaviour (Landry et al., 2018; Truelove et al., 2018; D'Agostin et al., 2020a).

Balkhy et al. (2010), when studying the awareness, attitudes, and practices related to H1N1, found that education level was the only significant predictor of the level of concern for H1N1. Latiff et al. (2012) found that educational level showed significant associations with patients' knowledge, attitudes, and practices in relation to the H1N1 pandemic and its prevention. In a similar vein, Lin et al. (2011), researching the Chinese public response to the H1N1 pandemic, identified that people with completed higher education had a higher risk perception and greater adherence to preventive behaviours. Also, Gao et al. (2020) mapped out that people with a lower educational level expressed more negative expectations regarding COVID-19.

Therefore, we propose that the impact of the level of education on consumers' emotions regarding the adoption of PSS is moderated by the COVID-19 pandemic. As such, our fifth hypothesis posits that:

H5 – The COVID-19 pandemic moderates the relationship between consumers' educational level on consumers' emotions towards use-oriented PSS adoption.

Figure 2 graphically presents the three research questions established in our study. Firstly, research question 1 analyses consumers' emotions associated with the decision-making process for the adoption of use-oriented PSS. Then, research question 2, adopts a different standpoint, and it aims to identify whether the pandemic has changed consumers' emotions towards use-oriented PSS. Finally, research question 3 addresses the impact of COVID-19 on consumers' emotions towards use-oriented PSS.

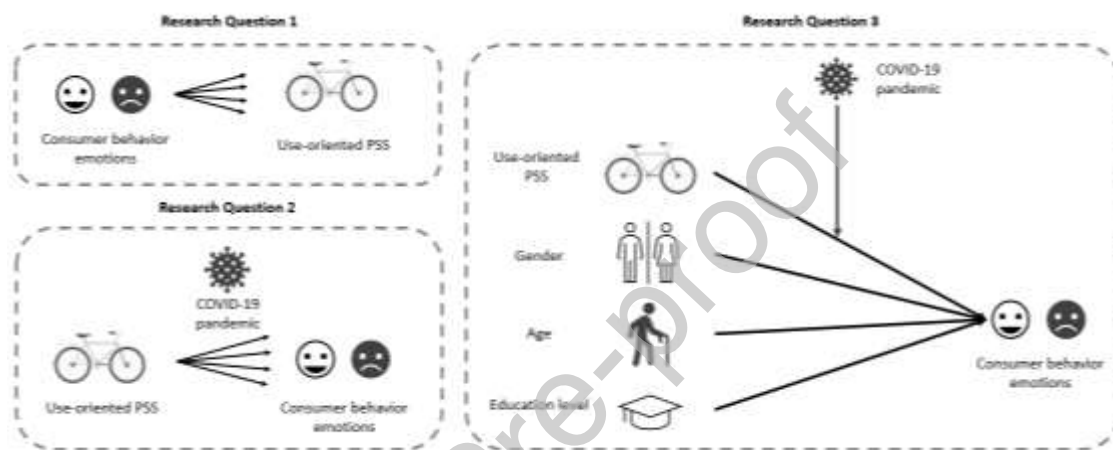


Figure 2 – Graphical representation of the research questions

3. Method

To reach our objective, we used descriptive research of a multiple transversal approach. In this approach, two or more samples of interviewees are surveyed, and each sample is collected only once (Malhotra, 2009). Our data derive from two distinct sample collections: one prior to the existence of COVID-19 and one amid the COVID-19 pandemic.

3.1 Data collection and Measures

The data collection instrument used in this research was a structured questionnaire (Appendix A). Our questionnaire's objective was to verify how consumers positioned themselves with respect to emotions and feelings when evaluating the adoption of use-oriented PSS (prior to and amid the COVID-19 pandemic). It must be noted that we offered examples of use-oriented PSS in the introduction section of the instrument. We consider this initial presentation relevant since the presentation of the study object to the respondents allows for a greater veracity of the researched facts (Malhotra, 2009).

After the reverse translation of the CES Scale, the researchers conducted a linguistic analysis⁵ of the expressions in the scale for the Brazilian context. This decision was made since social and cultural aspects can interfere in the comprehension of the emotion terms of the scale used (Chentsova-dutton and Lyons, 2016). As a result, some factors were substituted by descriptors. Due to the instrument design strategy, which encompassed bipolarity of emotions (further explained in the next paragraph), some antonyms were added to the original scale. Additionally, based on studies that found the interference of guilt and pride in pro-environmental behavior (Pscicelli et al., 2015; Castro-González et al., 2019; Liang et al., 2019), the authors included these emotions as factors in the data collection instrument (in the CES these emotions are descriptors of the "Other items" factor).

Regarding the measurement mechanism used in the design of the instrument, we decided to use the Semantic Differential (Malhotra, 2009). This mechanism's choice is justified in its possibility of measuring affects and/or emotions arising from distinct phenomena using oppositions, that is, the use of antonymic adjectives in each end (Llinares and Page, 2007). Between the ends, each interval represents a determined magnitude expressed by either implicit or explicitly quantifiers (Malhotra, 2009). The intervals receive a numeric value, which could be -3, -2, -1, 0, +1, +2, +3. This scale was used to analyse emotions and use-oriented PSS (Section 4.1), and they were linearly transformed into a scale of 1, 2, 3, 4, 5, 6, 7 to facilitate the interpretation of MANOVA and the regression coefficients in sections 4.2 and 4.3 (Hsu et al., 2000). Finally, before proceeding to the data collection procedures, the questionnaire was validated by three specialists (one psychology scholar with a Ph.D. degree and extensive research on psychology and the relationship between emotions and sustainability and the environment, one engineering scholar with a Ph.D. in Industrial Engineering and experience in statistical experimentation, and one practitioner from the marketing field with wide experience in consumer behaviour research). In addition to the CES scale, we also inquired respondents about their prior use of PSS offers, gender, age group, and education level. Table 1 summarizes the characteristics of the variables collected and their scales.

Table 1 - Characteristics of the variables collected and their scales

Type	Variable Name	Measures
Independent Variables	COVID-19*	Dummy-coded variable Pre-COVID-19 = -1 Amid-COVID-19 = 1
	PSS use	Dummy-coded variable No = -1 Yes = 1
	Gender	Dummy-coded variable Female = -1 Male = 1
	Age	Between 18 and 24 years old = -1 Between 24 and 35 years old = 0 Older than 35 years = 1
	Education level	High school = -1 Bachelor's degree (full or incomplete) = 0 Graduate course (full or incomplete) = 1

⁵ The linguistic analysis of the factors and descriptors resulting from the reverse translation observed, fundamentally, (i) the neurolinguistics (language and mind) and (ii) the sociolinguistics (language and society) (Chomsky, 1975).

Dependent Variables	Peacefulness; Contentment; Unconcern; Joy; Trust; Pride; Sympathy; Welcomed; Love; Optimism; Enthusiasm; Positive Surprise; Passion; Relief; Serenity.	CES scale: 7-point Likert scale
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* Pre-COVID-19 refers to the first questionnaire collected in November 2019. Amid-COVID-19 refers to the questionnaire collected in May 2020.

Regarding its classification, the sampling is non-probabilistic by convenience. Non-probabilistic sampling may be chosen when time, financial, material, and human constraints make probabilistic sampling unfeasible (Kumar et al., 2002). However, we stress that even though non-probabilistic studies have restrictions regarding the generalizations resulting from their findings, when properly conducted, they can produce satisfactory results that are faster and less expensive (Curwin and Slater, 2008). Nevertheless, convenience sampling is the prevailing non-probabilistic sampling method, and it addresses the approach where subjects (respondents) at hand are recruited at events or locations based on researchers' convenience of questionnaire collection (Wolf et al., 2016).

Since our research addresses PSS consumption, researchers approached consumers near bike-sharing spots, ride-sharing apps drop-off locations (to collect data with possible PSS consumers), shopping malls, and university student centres (to collect both possible PSS consumers and non-consumers). Additionally, we collected data using an online form as a secondary data collection mechanism in the pre-COVID-19 phase and as the exclusive data collection source in the amid-COVID-19 phase.

Data was collected in Brazil, a developing country where PSS consumption has recently started to gain momentum (Salman and Fujita, 2018). The first data collection phase was conducted in November 2019, as a part of an ongoing project that addressed PSS consumption, before the COVID-19 pandemic. The first cases of COVID-19 were reported in China in December 2019 (WHO, 2020). For this initial session, 100 responses were collected using both digital and in-person data collection procedures.

The second session was collected during May 2020. At the beginning of the second session's data collection, COVID-19 had around 91,000 accumulated confirmed cases and approximately 6,000 deaths in Brazil. As data collection continued, a spike of cases was witnessed, and when we finished the collection, Brazil had already more than 510,000 accumulated cases (with more than 29,000 deaths caused by COVID-19) (DATASUS, 2020). Due to the transmission characteristics of the virus, the second session was fully conducted digitally using Google Forms. In this session, 92 valid responses were collected (after the exclusion of one invalid response). As the same instrument was used in both phases (only headlines and initial explanations were different), both datasets were merged into one by aggregating the 100 pre-COVID-19 questionnaire responses and the 92 amid-COVID-19 responses.

To ensure that sample size adequately suits the data analysis procedures adopted (namely multivariate analysis of variance and multiple regression), we followed Hair et al., (2018) recommendations for MANOVA research design. Based on this, we ensured that sample size ($n = 192$) was greater than the number of dependent variables (15 CES emotions). The minimum threshold of 20 observations per group (pre-COVID and amid-COVID) was exceeded, as there are 100 observations in the pre-COVID group, and 92 in the amid-COVID group. Lastly, we also sought a balanced sample size distribution in both COVID groups. Similar sample sizes

for MANOVA analysis in consumer behavior studies have been adopted by Kim and Park (2020), O'Connor et al. (2017), and Minton and Rose (1997). It must also be noted that MANOVA and regression analysis are not sensitive to reduced sample sizes, and therefore, they provide robust results with a sample size similar to the one adopted in our research.

We operationalized the COVID-19 variable by creating a new column in the dataset entitled "COVID-19". The column assumed the value [-1] if the respondent was surveyed in November 2019, and [1] if the respondent was surveyed amid the COVID-19 pandemic (in May 2020). To assure that consumers were aware of our objective of measuring the impact of the COVID-19 pandemic on consumer behaviour, we explicitly stated in the instructions of the second data collection questionnaire our intentions of understanding the impact of the COVID-19 pandemic on consumers' emotions towards PSS consumption. Although we provided examples of PSS to prime this type of offer consumption on consumers' responses, we did not explicitly relate COVID-19 health-related and transmission aspects to PSS consumption, to avoid respondent manipulation. This allowed us to effectively evoke and capture consumers' self-expressed PSS consumption-related emotions without establishing pre-defined cause-effect relationships. Hence, in total, the final sample is composed of 192 valid responses. For a descriptive summary of the statistics, see Appendix B.

3.2 Dimension reduction for regression

The adapted version of CES used in this paper is composed of 15 emotions that tend to be highly correlated. Reducing the dimensionality of response variables is indicated to allow for more manageable constructs that enable improved interpretation of the results in regression analysis (Vigneau and Qannari, 2003). According to Vigneau and Qannari (2003), clustering of variables is an effective means of organizing multivariate data into meaningful structures. Following this approach, for the regression analyses, we reduced the dimensionality of the scale through a k-means clustering technique to CES variables using the squared Euclidean distance as a distance metric to group variables. The best configuration was that composed of three clusters (henceforth named constructs), the first containing 3 variables, the second one containing 5 variables, and the third containing 7 variables. An analysis of the correlation matrix confirmed three majorly correlated groups of variables.

The constructs reflect the underlying latent concept of the variables that form it. The first construct (Peace and Serenity) is composed of the variables Peacefulness, Serenity and Welcomed. The second construct (Trust and Relief) contains five variables: Trust performance, Sympathize with adopters, Unconcern, Contentment, and Relief. While the third construct (Optimism and Enthusiasm) is formed by Positive surprise, Optimism, Enthusiasm, Passion, Love to find PSS offers, Joy to use products I want, and Pride. We also validated the CES scale and the three constructs using Cronbach's alpha and Confirmatory Factor Analysis (see section 3.4). After the constructs were validated, we created a new variable for each construct represented by the average of the variables that compose that given construct for each observation.

3.3 Data analysis

Data analysis followed a sequence of procedures to test the hypotheses proposed in Section 2. First, we used a multivariate analysis of variance (MANOVA) to test for H1 as to whether consumers' emotions changed from the pre-COVID-19 phase to the amid-COVID-19 phase. MANOVA allowed verifying if there is a significant difference in emotions' means considering the pre and amid pandemic phases. MANOVA uses the covariance between dependent variables to test the significance of mean difference in response variables for different factors of a categorical independent variable (Hair et al., 2018). In our model, the CES's 15 emotions were used as dependent variables, and COVID-19 phase (pre and amid) was used as the independent variable. To account for the variability of the other effects and remove them from the error term, we also included the following main effects in the MANOVA model, together with their interaction with COVID-19 phase: PSS use, gender, age, and education level.

We also used ordinary least squares (OLS) multiple regression models where the constructs from the k-means clustering technique were used as dependent variables and the COVID-19 phase, PSS use, gender, age, education level as independent variables. We also included moderation terms for gender, PSS use, age, education level as 2-level interactions with COVID-19 phase to test H2-H5. These regression models were conducted to elucidate the effect size of COVID-19 phase on emotions. The OLS regression models provide estimates of the effect of independent variables on dependent variables. OLS regression estimates the predicted change in the dependent variable (in our equations, the emotion constructs) given the changes in the independent variables (PSS use, Gender, Age, Education level, and their moderation effects with the variable COVID-19 phase) (Hair et al., 2018; Wooldridge, 2018). Therefore, OLS regression models are models of additive characteristics that allow estimating the cumulative impact of the independent variables on the dependent variables, which is in line with our third research question. Nevertheless, such a statistical algorithm requires testing assumptions of multicollinearity among independent variables, multicollinearity, normality, linearity, and homoscedasticity (Hair et al., 2018). Figure 3 shows the regression model analysed and the constructs considered to respond to research question 3 (H1 is related to research question 2 and we used MANOVA to test it).

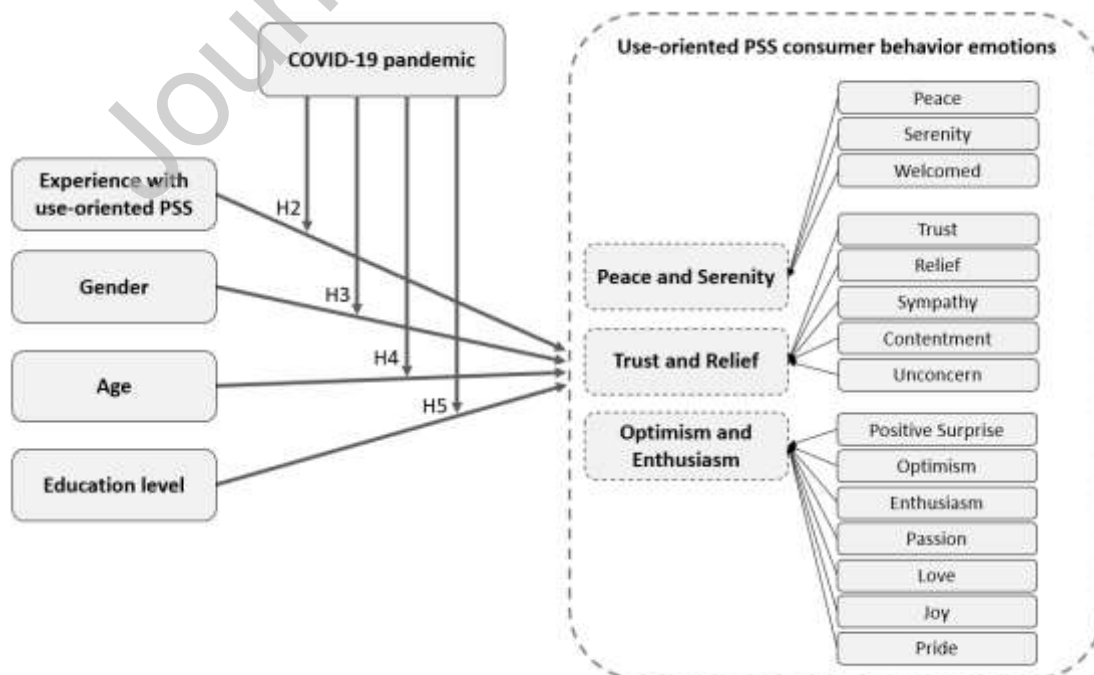


Figure 3 – Regression model and the constructs analysed**3.4 Reliability and Validity**

As an established scale, CES has been used and validated in several studies and it can be considered a reliable scale to reflect consumers' emotions (Laros and Steenkamp, 2005). We tested for the CES scale's convergent validity using Cronbach's alpha and Confirmatory Factor Analysis (CFA). The full scale presented satisfactory alpha results of 0.925. The constructs derived from the k-means clustering procedures also presented satisfactory alpha results, except for [Peace & Serenity], which is slightly below the test's 0.7 threshold. Nonetheless, as CES is widely used and its validity has been previously established, and given the mathematical nature of k-means clustering, a below threshold alpha for one construct was accepted.

As for the CFA tests, we tested for convergent validity through composite reliability (should be >0.7) and goodness of fit through Standardized Root Mean Square Residual (SRMR) (<0.08) and Normed χ^2 (χ^2/df) (<5) (Hair et al., 2018). Composite reliability met the minimum threshold for Trust & Relief (0.838) and Optimism & Enthusiasm (0.864), and a satisfactory result for Peace & Serenity (0.655). Regarding goodness of fit, our model obtained a Normed χ^2 of 3.55 ($\chi^2=309.256$, $df=87$) and SRMR of 0.06, presenting satisfactory fit indices (Hair et al., 2018; Hooper et al., 2008). Also, confirming the model's adequate fit, all construct factor loadings were significant (Hair et al., 2018). It is worth noting that Cronbach's alpha for the Peace & Serenity construct is 0.659 (below the recommended threshold of > 0.7). Besides, one item of this construct (Serenity) presents a factor loading of 0.562 (below the recommended thresholds of > 0.6). This means that Peace & Serenity is not as strong a construct as the other two. Nevertheless, we decided to keep this construct and this factor in the model because they are just slightly below the recommended thresholds and the loadings of the three factor items in the construct are significant at the 0.05 level adopted, rendering them acceptable. Table 2 presents the constructs, and the CFA validity tests. In Appendix B, we present Cronbach's alpha results and additional constructs' statistics of CFA.

Table 2 - Constructs and validity tests

Construct	Variables	Loadings	Composite Reliability	Cronbach's alpha
Peace & Serenity	Peacefulness	0.700***	0.655	0.659
	Serenity	0.562***		
	Welcomed	0.604***		
Trust & Relief	Trust	0.717***	0.838	0.835
	Sympathy	0.743***		
	Unconcern	0.723***		
	Contentment	0.731***		
	Relief	0.648***		
Optimism & Enthusiasm	Positive surprise	0.646***	0.864	0.857
	Optimism	0.711***		
	Enthusiasm	0.727***		
	Passion	0.613***		
	Love	0.748***		
	Joy	0.736***		
	Pride	0.643***		

4. Results

This section has three subsections, in line with established research problems: emotions and use-oriented PSS (4.1); consumer emotions and effect of COVID-19 (4.2); and impact of the COVID-19 on consumers' emotions towards use-oriented PSS (4.3).

4.1 Emotions and Use-Oriented PSS Adoption

According to the data presented in table 3, most consumers preferred to position themselves closer to positive emotions rather than negative ones. This means that a great share of the sample understands that the adoption of use-oriented PSS does not cause stress or displeasure, common feelings associated with negative emotions (Watson et al., 1988; Watson and Spence, 2007). On the contrary, the decision-making process that we investigate can enable positive feelings like attraction, enthusiasm, and willingness to act (Bagozzi et al., 1999).

Table 3 - Consumer's emotional positioning toward use-oriented PSS

Negative	-3	-2	-1	0	1	2	3	Positive		
A	1	2	3	4	5	6	7	B	Mean*	SD*
I feel angry in the use-oriented PSS adoption	0	0	0	14	25	31	30	I feel peacefulness in the use-oriented PSS adoption	5.766	1.033
Use-oriented PSS make me feel discontent	0	0	10	16	17	26	31	Use-oriented PSS make me feel contentment	5.976	1.107
I feel worried when I use PSS	1	4	7	19	17	28	24	I feel unconcerned when I use PSS	5.755	1.021
I feel sad when I have to use PSS for products that I desire	0	0	0	14	26	32	28	I feel joy to know that I can use products that I want through PSS	5.736	0.933
I feel fear when I am using PSS	1	7	15	8	23	33	13	I trust in the performance of PSS	5.853	0.913
I can feel ashamed when I don't know how to use PSS	5	12	14	6	14	20	29	I feel pride when I use PSS	6.102	0.924
I envy who adopted to use PSS	0	0	0	8	11	34	47	I sympathize with people who adopted to use PSS	6.308	0.932
I feel lonely when I look for use-oriented PSS	1	16	21	17	18	16	11	I feel welcomed when I search for use-oriented PSS	5.732	1.075
I hate to adopt use-oriented PSS	0	0	0	17	43	18	22	I love to find use-oriented PSS in the places	5.513	1.018
I am pessimist about the use-oriented PSS	0	3	3	8	30	33	23	I am optimist about the use-oriented PSS	5.804	0.921
I feel disappointed in the use of PSS	0	1	0	20	30	33	16	I feel enthusiasm in the use of PSS	5.490	0.989
I feel frustrated when I do not find use-oriented PSS	4	16	15	8	24	17	16	I am positively surprised when I find use-oriented PSS	5.785	0.949
I have contempt for use-oriented PSS	0	0	0	39	35	21	5	I have passion for use oriented PSS	4.879	0.895
I feel guilty when I do not use PSS	8	12	15	3	20	23	19	I feel relieved when I use PSS	5.908	0.864
The process of choosing and using PSS makes	0	0	0	43	23	17	17	The process of choosing and using PSS brings me	5.057	1.134

me feel eager									serenity		
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*Mean and standard deviation (SD) are reported based on the 1-7 scale (linearly transformed from the -3 to 3 scale for clarity purposes)

Note: n = 100 (only pre-COVID-19 responses are reported)

Table 3 shows that the positive emotions most triggered concerning use-oriented PSS adoption were sympathy (92%), joy (86%), peacefulness (86%), optimism (86%), and love (83%). The percentage of positive emotion triggering is calculated by summing the occurrence of the three positive points of the scale (5, 6, and 7 in the 1 to 7 scale) and dividing it by the number of respondents (n = 100). This result shows that both conscious and basic emotions are present in the process of adopting use-oriented PSS. However, love, peacefulness, and joy also had citations at the neutral point of the scale (17%, 14%, and 14%, respectively). Regarding negative emotions, we highlight loneliness (38%), guilt (35%), frustration (35%), shame (31%), and fear (23%). The percentage of negative emotion triggering is calculated by summing the occurrence of the three negative points of the scale (1, 2, and 3 in the 1 to 7 scale) and dividing it by the number of respondents (n = 100). This analysis provides an overview of how consumers relate to the PSS consumption emotions and whether they are more inclined to feeling positive or negative emotions.

4.2 Consumer Emotions and Effect of COVID-19

To test *H1*, first, we conducted a MANOVA to identify whether COVID-19 pandemic changed how consumers relate to PSS consumption based on their emotions. Hence, COVID-19 phase was used as the independent variable, and CES variables were used as dependent variables. MANOVA results presented in Table 4 show significance for COVID-19 phase ($p < 0.01$ using either Pillai's trace, Wilk's lambda, Hotelling's trace, or Roy's largest root). These results show that emotions' average changed from the pre-COVID-19 phase to the amid-COVID-19 change and supports *H1*. We also found a significant difference for the PSS use (versus no use) groups ($p < 0.05$) and age groups ($p < 0.1$). The interaction between COVID-19 phase and Age was also significant ($p < 0.01$), which provides initial evidence to support *H2*. Table 4 presents the results of the MANOVA model.

Table 4 - MANOVA model

		Pillai's Trace	Wilks' Lambda	Hotelling's Trace	Roy's Largest Root
COVID-19 phase	Test Statistic	0.348	0.652	0.533	0.533
	F-value	5.835***	5.835***	5.835***	-
PSS use	Test Statistic	0.143	0.856	0.167	0.167
	F-value	1.827**	1.827**	1.827**	-
Gender	Test Statistic	0.074	0.925	0.080	0.080
	F-value	0.884	0.884	0.884	-
Age	Test Statistic	0.227	0.785	0.257	0.149
	F-value	1.413*	1.406*	1.399*	-
Education level	Test Statistic	0.164	0.841	0.181	0.124

	F-value	0.985	0.984	0.984	-
COVID-19 phase x PSS use	Test Statistic	0.081	0.918	0.088	0.088
	F-value	0.969	0.969	0.969	-
COVID-19 phase x Gender	Test Statistic	0.107	0.892	0.119	0.119
	F-value	1.311	1.311	1.311	-
COVID-19 phase x Age	Test Statistic	0.292	0.727	0.349	0.239
	F-value	1.881***	1.889***	1.896***	-
COVID-19 phase x Education level	Test Statistic	0.180	0.825	0.203	0.152
	F-value	1.094	1.100	1.106	-

$n = 192$ * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

After the MANOVA confirmed that emotions changed from the pre-COVID-19 to the amid-COVID-19 phases, we proceeded to analyse the means for each phase through several individual Analysis of Variance (ANOVA) tests. Therefore, each of the 15 emotions from the CES was used individually as dependent variable and the COVID-19, PSS use, gender, age, education level, and their two-level interactions with COVID-19 phase were included in the model. We found that peacefulness, contentment, unconcern, joy, trust, pride, sympathy with consumers, positive surprise, and serenity had a significant mean change from the pre-COVID-19 phase to the amid-COVID-19 phase ($p < 0.05$). The average for such emotions was greater in the pre-COVID-19 phase, which provides evidence of the pandemic's negative effect on consumers' emotions. Welcome, love, optimism, enthusiasm, passion, and serenity did not differ significantly from the pre-COVID-19 phase to the amid-COVID-19 phase. It is worth noting that the averages were always lower in the pandemic period (compared to the pre-COVID-19 phase), but for this last set of variables, the difference did not reach the threshold of $p < 0.05$. Table 5 presents the emotions' average in the pre- and amid-COVID-19 phases and the F-value of the ANOVAs.

Table 5 - Emotions' averages for the pre- and amid-COVID-19 phases

CES emotion	Fitted average Pre-COVID-19	Fitted average Amid-COVID-19	F-value
Peacefulness	5.766	5.273	4.88**
Contentment	5.976	5.217	11.06***
Unconcern	5.755	4.492	21.32***
Joy	5.736	5.247	3.96**
Trust	5.853	4.913	17.41***
Pride	6.102	4.870	30.07***
Sympathy	6.308	5.422	19.25***
Welcomed	5.732	5.314	3.68*
Love	5.513	5.171	2.91*
Optimism	5.804	5.430	3.75*
Enthusiasm	5.490	5.186	2.46
Positive Surprise	5.785	4.723	21.91***
Passion	4.879	4.825	0.09

Relief	5.908	4.664	37.92***
Serenity	5.057	4.863	0.38

Note: Pre-COVID-19 $n = 100$; Amid-COVID-19 $n = 92$. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

4.3 The impact of the COVID-19 on consumers' emotions towards use-oriented PSS

We also examined the effect of COVID-19 phase on emotions by building OLS regression models. We used the emotion constructs created through the k-means clustering as dependent variables and the main effects of COVID-19 phase, PSS use, gender, age, and education level as independent variables. To further understand the impact of COVID-19 phase on consumers (H1), we analysed the main effect of COVID-19 phase on emotions. Besides, to examine H2, we analysed the moderation effect of PSS use on the relationship between COVID-19 phase and the emotions constructs. For H3, we analysed the moderation of gender on the relationship between COVID-19 phase and emotions; the moderation of age on the relationship between COVID-19 phase and the emotions was analysed for H4; and, the moderating effect of education level on the relationship between COVID-19 phase and emotions was used to analyse H5. The significant interaction is to be interpreted as the dependence of COVID-19 phase's effect on the magnitude of another explanatory (moderating) variable when impacting the response variables (emotions' constructs) (Wooldridge, 2016).

To test the hypotheses, COVID-19 phase, PSS use, gender, age, and education level, together with their interaction terms with COVID-19 phase were set as independent variables. In Model 1, the construct Peace and Serenity was regressed on the independent variables. In Model 2, Trust and Relief were used as the dependent construct and, in Model 3, Optimism and Enthusiasm worked as the dependent construct. Considering OLS regression assumptions, we tested for normality (through skewness and kurtosis), linearity, multicollinearity, and homoscedasticity by analysing fitted versus residual values as recommended in Hair et al. (2018). Skewness and kurtosis analysis for the continuous variables did not exceed the threshold limits (-2 to +2), which indicates that the normality assumption was met (George and Mallery, 2010) (see Appendix B).

Additionally, we used a Q-Q plot for visual analysis of normal probability, and the results show that the normality assumption was not violated. Multicollinearity was tested based on the variance inflation factor (VIF), which measures independent variables' collinearity using multiple regressions (Hair et al., 2018). The VIF of independent variables ranged from 1.05 to 1.39, below the threshold of 10 (Hair et al., 2018). Hence, the multicollinearity assumption was not violated. We also tested normality using histograms of the continuous variables from the CES, and by plotting the histogram of the response variables' residuals for visual inspection of normal distribution. Linearity was visually tested using scatter plots. Both assumptions were not violated by our model.

Therefore, we proceeded to apply the OLS regression algorithm for the three models. Our results show that **Model 1** (Peace and Serenity) was significant ($p < 0.01$, Adjusted $R^2 = 0.211$), as well as **Model 2** (Trust and Relief) ($p < 0.01$, Adjusted $R^2 = 0.302$), and **Model 3** (Optimism and Enthusiasm) ($p < 0.01$, Adjusted $R^2 = 0.128$). The findings show that the effect of COVID-19 phase was significant ($p < 0.05$) only for **Models 2 and 3**. In these models, a change from the pre- to the amid-COVID-19 phase decreased consumers' trust and relief and their optimism and enthusiasm (Model 2: $\beta = -0.484$, $p < 0.01$; Model 3: $\beta = -0.193$, $p < 0.01$). We also

found that as a main effect PSS use has a negative significant impact on Peace and Serenity ($\beta = -0.215$, $p < 0.01$), nonetheless, this effect is not related to the COVID-19 pandemic and might be associated with PSS offers' complexity that causes cognitive overload during decision making. The main effect of age was also found to significantly impact Peace and Serenity ($\beta = 0.265$, $p < 0.01$) and Trust and Relief ($\beta = 0.254$, $p < 0.01$). Table 6 summarizes the results of the three regression models.

Table 6 - Regression Models

	Model 1 Peace and Serenity	Model 2 Trust and Relief	Model 3 Optimism and Enthusiasm
Constant	5.322***	5.46***	4.686***
COVID-19 phase	-0.132*	-0.484***	-0.193***
PSS use	-0.215***	-0.055	-0.006
Gender	-0.121*	-0.020	-0.056
Age	0.265***	0.254***	0.096
Education level	0.025	-0.037	0.058
COVID-19 phase x PSS use	-0.069	-0.049	0.048
COVID-19 phase x Gender	0.031	0.040	0.088*
COVID-19 phase x Age	0.438***	0.231**	0.181**
COVID-19 phase x Education level	-0.216*	-0.045	-0.134
<i>F-value</i>	6.71***	10.20***	4.13***
<i>R²</i>	0.249	0.335	0.169
<i>Adjusted R²</i>	0.211	0.302	0.128

Note: Standardized coefficients are reported. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Findings do not show a significant relationship between the interaction of COVID-19 phase and PSS use on any of the three models. Thus, H2 is not supported by our results. Similarly, the results for the impact of the interactions between COVID-19 phase and gender, and COVID-19 phase and education level on the three constructs were also not significant. Therefore, our results do not provide evidence to support either H3 or H5 (see table 7). Nonetheless, the moderation of age on the impact of COVID-19 phase on emotions was significant for the three models ($p < 0.05$). This result fully supports H4 that the effect of COVID-19 on consumers' emotions depends on consumers' age group. Based on that, we analysed the averages of emotions for the different age groups in the pre and amid-COVID-19 phases. For all age groups, the average in the amid-COVID phase was lower than during the pre-COVID-19 phase. Nonetheless, this effect is mostly concentrated in the "between 18 and 24 years old" group, where the difference from the pre to the amid-COVID-19 phases was greater when compared to the other groups. Figure 4 shows the moderating effect of age on the COVID-19 phase's impact on emotion constructs for peace and serenity (A), trust and relief (B), and optimism and enthusiasm (C).

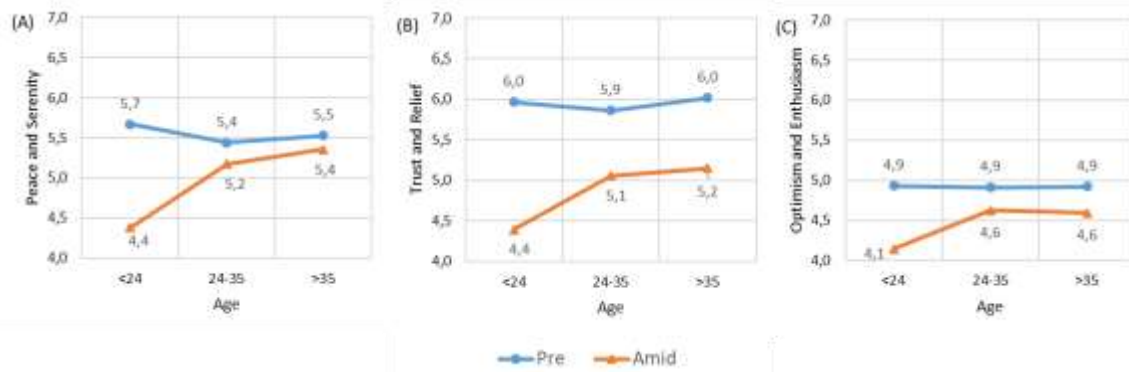


Figure 4 - Moderation effect of age on the impact of COVID-19 on emotions

Table 7 - Hypotheses and results

Hypotheses	Outcome	Results
H1 – Consumers’ emotions towards use-oriented PSS have changed due to the COVID-19 pandemic	Supported	Consumers’ emotions differed from the pre to the amid-COVID-19 phases. The averages of emotions related to Trust and Relief and Optimism and Enthusiasm decreased after the start of the pandemic
H2 – The effect of previous consumption of (experience with) use-oriented PSS offers on consumers’ emotions is moderated by COVID-19	Not supported	The impact of the pandemic on emotions was roughly the same on PSS users and non-users
H3 – The COVID-19 pandemic moderates the impact of gender on consumers’ emotions	Not supported	The impact of the pandemic on emotions was roughly the same for both genders
H4 - The COVID-19 pandemic moderates the relationship between consumers’ age and their emotions. Therefore, young consumers’ emotions are expected to be more affected by the pandemic than other age groups	Supported	The impact of the pandemic, degrading the set of emotions, was greater in younger people
H5 - The relationship of educational level on consumers’ emotions is moderated by the COVID-19 pandemic	Not supported	The impact of the pandemic on emotions was roughly the same for the different education levels

5. Discussion

Through an adaptation of Richin’s (1997) CES Scale, our findings show that in the decision process for use-oriented PSS adoption, consumers are closer to positive emotions rather than negative ones. Another important result is the identification that basic emotions, like joy and love, were frequent in the pre-COVID-19 data collection. Besides, we also note that some individuals expressed negative emotions such as loneliness, guilt, frustration, shame, and fear. Analysing these results in comparison to previous studies, we understand that joy is more related to pro-environmental engagement (as found by Kolling et al., 2020) than to narcissism (as found by Hwang and Kim, 2016). We also infer that the same happened with love. Respondents related love to the feeling they experience for knowing that use-oriented PSS are available, and not with “possessive love”, as mapped in other studies (Dong et al., 2018). We emphasize that, if love is related to the feeling of possession and ownership, it can inhibit use-

oriented PSS due to this offer's characteristics, as consumers do not have ownership of the product (Mont 2002 and 2004; Tukker, 2015; Annarelli et al., 2016; Schmidt et al., 2016; Yin et al., 2018, among others).

Still comparing the results obtained in the pre-COVID 2019 data collection with other studies (focused on green product purchasing or PSS adoption), the negative emotion guilt can be understood as a driver for PSS adoption (Peloza et al., 2013; Onwezen et al., 2013 and 2014; Theotokis and Manganari, 2015; Piscicelli et al., 2015, among others). As for the feelings of loneliness and frustration, their experience is related to utilitarian attributes. As loneliness and frustration may be associated with the difficulty of making available and maintaining this type of provision in the neighbourhood, city, and region in which respondents reside. Previous research has indicated that insecurity (Schorr, 2014; Catulli et al., 2017) and disbelief (Kristensen and Remmen, 2019) inhibit the PSS adoption process. Complementarily, previous research has indicated that access and maintenance can be significant barriers to PSS adoption (Mont, 2002 and 2004; Mont and Tukkar, 2006; Piscicelli et al., 2015; Schulte and Voß, 2015; Annarelli et al., 2016). Finally, we infer that shame and fear, as in the study by Schmidt et al. (2016), were related to not knowing how to use PSS.

Regarding the effect of pandemic on emotions related to the adoption of use-oriented PSS, we found that COVID-19 has negatively impacted emotions from the CES scale. In other words, the COVID-19 pandemic has a negative effect on consumers' emotions and feelings in the process of adopting use-oriented PSS. In the data collection carried out during the pandemic, consumers moved from the positive side to the more negative one. This can be noted based on the decrease of the emotions' averages presented in Table 5. Specifically comparing the emotions with the highest frequencies in pre-COVID-19 data collection, sympathy, joy, and peacefulness suffered a significant average descent effect due to the pandemic. Also, negative emotions such as fear, shame, and guilt, which were already present in the pre-COVID-19 phase (that is, some respondents had denoted those negative emotions), had an increase in manifestations in amid-COVID-19. This fact indicates that the pandemic significantly reduced individuals' approximation to emotions of trust, pride, and relief (respectively).

Theoretically, positive emotions reflect the extent to which a person feels enthusiastic, active, and alert (Watson et al., 1988). Whereas negative emotions are subjective dimensions caused by stress and displeasure that end up subjecting a person to a series of aversion variables (Duhachek, 2005). Positive and negative emotions are directly related to the perception of risks (Kahn and Isen, 1993; Luce, 1998). In this case, it is worth mentioning Tull et al. (2020), whose research indicates that, due to the instability and uncertainties generated by the pandemic, the incidence of negative emotions in people, such as fear and eagerness, was increased. Therefore, we can infer that the emotions and feelings provoked by the pandemic tend to interfere in the feelings and emotions of consumption related to the adoption of use-oriented PSS.

Additionally, Loxton et al. (2020) identified that consumer behaviour during the COVID-19 crisis is in line with behaviour exhibited previously during historical shock events. In this sense, in addition to consumers tending to panic buying, herd mentality, and prioritizing purchases focused on basic needs, consumer emotions were broadly and negatively influenced by media coverage of COVID-19. In the same vein, a study by Kilgo et al. (2019) clarifies that the media tends to contribute disproportionately to the panic caused by crises, increasing people's anxiety and fear. As verified by Pieri (2019) when analysing how people responded to

H1N1 and the Ebola outbreak of 2014-2015, extensive media coverage promotes insecurity and collective hysteria, compromising consumers' behaviour towards different products.

Evaluating the three constructs of emotion, the negative impact of COVID-19 is significant on "Trust and Relief" and "Optimism and Enthusiasm". When evaluating the emotions that constitute the two groups, we found that sympathy (model 2) and love (model 3) are important antecedents of altruism (Midlarsky, 1968; Midlarsky and Suda, 1978). Unconcern, contentment, and relief (model 2), joy and pride (model 3), can trigger social concern (Naess and Haukeland, 2008). Studies carried out before the pandemic had signalled that altruism and social awareness tended to drive the adoption of use-oriented PSS (Armstrong et al. 2016; Catulli et al., 2017; Akbar and Hoffmann, 2018; Mashhadi et al., 2019). As traumatic events tend to increase "self-interest" in individuals (Mansbridge, 1990), we found an important change in consumer emotions related to the PSS adoption process. As stated by Cohen (2020), the social detachment practiced, aiming to reduce the risk of transmission, tends to reinforce individualized commitments to the detriment of public commitments and, consequently, shared consumption modes, a fact that meets our results.

As for the Peace and Serenity model, the COVID-19 pandemic did not have a statistically significant impact. In this case, comparing the pre-COVID-19 phase with the amid-COVID-19 phase, we noticed that the averages for two of the emotions that make up the group (welcoming and serenity) already had low frequencies when compared to the others, mainly for serenity, which had a 43% frequency at the point of indifference of the scale (pre-COVID 19 phase). As previously mentioned, when we highlight the negative emotions that presented frequencies in the pre-COVID 19, these results are related to the connection of these feelings with utilitarian attributes, such as performance and availability. The eagerness in consumption (opposite emotion of serenity on the scale) indicates the uncertainty of success, imaginary obstacles, idealization of the pleasure to be experienced, and the amount of time necessary to reach the goal (Lazarus, 1991; Macinnis and Mello, 2005). Therefore, in our understanding, the fact that COVID-19 did not have an impact on this group of emotions is related to the nature of use-oriented PSS offerings.

Regarding the fact that past experience does not significantly moderate the effect of COVID-19 on the emotions associated with use-oriented PSS adoption, the pandemic is believed to cause a widespread perception of a significant threat to human life and health, reducing people's sense of coherence (as demonstrated by Dymecka et al., 2020). Psychologically, adequate levels of a sense of coherence allow effective stress management and a reduction in the level of anxiety, which directly affects subjective well-being (Bayne, 2000). In a pandemic context, the fear of COVID-19 consequences expands emotional and cognitive risks for different decision-making processes. Although Matiza (2020) has described that individuals feel safer with what they are already familiar in a pandemic scenario, based on risk perception, we believe that the physical risk related to sanitary issues, already mapped by other authors in the PSS adoption strongly interferes (Armstrong et al., 2015; Edbring et al., 2016).

About the demographic variables analysed, our study did not confirm the moderating effect of gender and educational level. This result is probably supported by the fact that women, usually more condescending and focused on valuing community goals (Baudrillard, 1998; Underhill, 2009), are being more affected by feelings of anxiety and stress during the pandemic (Loxton et al., 2020; Mazza et al., 2020). As for the educational level, it is important to highlight that, in studies of pro-environmental behaviour, there are still controversies

regarding the positive relationship between educational level and green behaviour (Kinnear et al., 1974; Samdahl and Robertson, 1989). Finally, our result regarding the age variable provides relevant insights on the impact of COVID-19 on emotions. In the younger consumers (between 18 and 24 years old), the negative effect of COVID-19 was greater under the emotions related to use-oriented PSS adoption. This result corroborates with previous research conducted by Losada-Baltar, et al., 2020 and González-Sanguino et al., 2020) and signals that older people tend to be more resilient in traumatic situations (Kimhi et al., 2020).

It is important to note that, as young consumers are more likely to purchase more sustainable offers (Lago et al., 2020), such as use-oriented PSS (D'Agostin et al., 2020a; Sands et al., 2020), the impact of COVID-19 on the sharing economy can be amplified if these consumers decide to avoid adopting offers shared. However, although less affected by the disease, we believe that young people are more frustrated with the limitations resulting from social isolation, which consequently affects their assessments and decision-making processes, such as those of purchase, adoption, and use. Regarding the perception of risk of contamination resulting from shared use, we infer that the perceived risk tends to be greater in older people.

5.1 Theoretical and Managerial Implications

Our results provide complementary theoretical support to the existing literature, identifying and evaluating the influence of emotions in the adoption process of use-oriented PSS. Although other studies have investigated the influence of emotional factors in the decision processes associated with pro-environmental behaviour, many studies focused on only one or two self-conscious emotions. The use of CES Scale, developed to measure emotions and feelings in consumption situations, enabled us to analyse a more comprehensive set of emotions. Therefore, a meaningful theoretical contribution of our study entails the identification of basic emotions, such as joy and love, in the process of use-oriented PSS adoption.

Another theoretical contribution of our study is the confirmation that an external traumatic event changes the emotions related to consumption. Whereas other studies have shown this before, in the context of shared consumption this study is pioneering. The data and analysis indicate that COVID-19 has increased self-interest in people, while emotions that predicted altruism and concern for society were significantly affected. Furthermore, other relevant findings include the verification that the use experience, as well as gender and education, do not significantly moderate the effect of COVID-19 on consumption emotions, although these variables have been confirmed in other studies as important moderators in pro-environmental consumption. Finally, the results presented here confirm that younger people tend to be more impacted by extreme events.

As for the managerial implications, our results can assist public and private managers in the qualification and adequacy of the use-oriented PSS offerings. First, we suggest that positive emotions such as sympathy, joy, peacefulness, love, and optimism are communicated to promote use-oriented PSS. Since the herd effect is still present in our behaviour, campaigns on social networks based on advertisements using examples focused on those emotions tend to promote engagement. Focusing on the location, availability and maintenance of the use-oriented PSS offerings is important too. The same counts for explaining the process to users, while illustrating the steps for the use procedure can minimize shame, loneliness, and fear.

During the COVID-19 pandemic, investing in hygiene protocols and clear and instructive communications is essential to reduce fear and anxiety in order to increase people's feeling of safety. As described by Cohen (2020), social scientists have long indicated that disasters, especially when the scale of their tragic consequences emerge at a constant pace, tend to catalyse social change processes. Therefore, we expect that the concern with health and sanitary issues will remain important in the post-pandemic day-to-day. Specifically, our findings show that the COVID-19 pandemic has affected the emotions of consumers of different age groups differently, as young consumers' emotions were more affected than other age groups. Hence, managers can develop specifically targeted advertisements through social media to reach young consumers (between 18 and 24 years old) and convince them of the safety measures of their PSS offers and to increase their positive emotions, especially self-conscious emotions like relief and pride, since the Z Generation has social awareness as a strong characteristic.

Product managers can also use this study's results during the creation of use-oriented PSS offers. More specifically, practitioners can act to minimize the negative impact on emotions by developing products that hold self-cleaning or sterilization mechanisms or cleaning and sanitization services. Additionally, grounded on the results, managers can change their PSSs offers. Cleaning, minimizing physical contact, choosing healthier materials, among other actions, are necessary qualifications, as well as the development of clear and persuasive communications. Such actions can provide cues that increase consumers' positive feelings as unconcern, trust, and positive surprise. Some of these practices have already been implemented by ride-sharing apps, bike-sharing services, and other use-oriented PSS offers.

5.2 Research limitations

As limitations of the research, our study did not evaluate the PSS adoption drivers and barriers in the research models, which could provide further insights on the mechanisms that lead consumers to purchase PSS and the emotions that interact with them. Also, our sample size, as well as the random distribution of people by demographic variables, such as educational level and income, limit the scope of our findings. Besides, we do not investigate the income variable. Such a point can present relevant results since people with lower incomes tend to suffer more from the pandemic because lower-income consumers seem to have more limited possibilities of social distancing and working from home.

Our study focused specifically on use-oriented PSS, and therefore, this hampers the possibility of extrapolating our findings to other PSS offerings (such as product-oriented or result-oriented). This limitation is based on the sharing and complex aspects that characterize use-oriented PSS, and as such, other studies can be carried out to analyse product and result-oriented PSS offers. We did not test consumers' personal experiences with the pandemic. And, hence, our study does not speculate regarding how personal experiences, beliefs, and norms relate to how consumers perceive the pandemic and consumption emotions. Finally, our sample was restricted to Brazilian consumers above the age of 18. This sampling limitation may cause extrapolation barriers and require further studies in other countries and with elderly consumers, for example.

6. Conclusions

Through a quantitative approach, our research aimed to analyse consumers' emotions associated with use-oriented PSS adoption and the impact of COVID-19 on consumers' emotions towards use-oriented PSS. Firstly, our findings show that consumers experience more positive (than negative) emotions when adopting use-oriented PSS. From the CES scale, we found that sympathy, joy, peacefulness, optimism, and love are the positive emotions most triggered during use-oriented PSS adoption. Additionally, the effect of COVID-19 on emotions related to the decision to use the PSS is significant. In this sense, we emphasize that basic emotions, which are antecedents of social emotions, have changed in the pandemic context, mainly due to the self-interest propensity. The negative impact of COVID-19 affected feelings, such as trust, sympathy, unconcern, content, relief, positive surprise, optimism, enthusiasm, passion, love, joy, and pride. The results show that, during the pandemic, the evaluation that people make about PSS use is influenced by fear, anxiety and stress caused by trauma. Due to the pandemic, factors identified as use inhibitors, prior to the global spread of the virus, seem to have increased in effect magnitude and may have impacted consumers' emotions (for instance sanitary issues, such as hygiene). Finally, we examined the effect of COVID-19 on groups of emotions using a regression model. The findings provide evidence that the effect of COVID-19 depends on consumers' age. More specifically, we show that the emotions of consumers aged 24 and below were more affected by the pandemic than consumers between 24 and 35, and those above 35.

Based on our results, our key recommendations to stakeholders, such as managers and policymakers, are to use positive emotions, such as sympathy, joy, peacefulness, love and optimism in the promotion of use-oriented PSS. In the context of the COVID-19 pandemic, we suggest stakeholders to improve and publicize hygiene protocols, as well as clear and instructive communications. Such actions tend to reduce fear and anxiety, increasing people's sense of security. We also propose that product managers use these results when creating use-oriented PSS offerings. In particular, professionals can act to minimize negative emotions by developing products that contain mechanisms for self-cleaning or sterilization or cleaning and sanitizing services. They can also change their PSS offerings to minimize physical contact and choose healthier materials.

Recommendations for future research in this specific topic include: (1) research whether the effects observed amid-COVID-19 pandemic remain in consumers' evoked set of emotions (or whether they will fade away) as the pandemic gets controlled; (2) research that evaluates whether there is variation in emotions according to the type of use-oriented PSS; (3) studies that verify the impact of different motivations (drivers) to use-oriented PSS adoption on consumer behaviour emotions moderated by the COVID-19 pandemic; and (4) replicability of this research in other countries with different cultural characteristics.

More broadly, our recommendations for future studies involve: (1) the investigation of emotions and their role in pro-environmental decision-making processes with the use of neuroscience or qualitative research (with projective techniques approach); (2) the analysis of the emotions influences the adoption process of product-oriented PSS and result-oriented PSS; (3) exploratory studies that help the understanding of how a traumatic event like COVID-19 affects sustainable production and consumption; and, finally, (4) research that explains how consumer emotions influence PSS in the context of sustainable consumption in cities.

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1

Appendix A - Questionnaire

2

Use-oriented PSS are offers that include the **sharing of objects and leasing**, such as bike sharing apps, ride apps, coworking spaces. Please think about the times when you adopted a use-oriented PSS offer or think about how you would feel if you were to use a use-oriented PSS

Analyse the opposing statements below and indicate how you feel about the use-oriented PSS adoption process:

A	(-3) Definitely A	(-2) Moderately A	(-1) Slightly A	(0) Indifferent	(+1) Slightly B	(+2) Moderately B	(+3) Definitely B	B
I feel angry in the use-oriented PSS adoption	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel peacefulness in the use-oriented PSS adoption
Use-oriented PSS make me feel discontent	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	Use-oriented PSS make me feel contentment
I feel worried when I use PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel unconcerned when I use PSS
I feel sad when I have to use PSS for products that I desire	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel joy to know that I can use products that I want through PSS
I feel fear when I am using PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I trust in the performance of PSS
I can feel ashamed when I don't know how to use PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel pride when I use PSS
I envy who adopted to use PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I sympathize with people who adopted to use PSS
I feel lonely when I look for use-oriented PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel welcomed when I search for use-oriented PSS
I hate to adopt use-oriented PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I love to find use-oriented PSS in the places
I am pessimist about the use-oriented PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I am optimist about the use-oriented PSS
I feel disappointed in the use of PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel enthusiasm in the use of PSS
I feel frustrated when I do not find use-oriented PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I am positively surprised when I find use-oriented PSS
I have contempt for use-oriented PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I have passion for use oriented PSS
I feel guilty when I do not use PSS	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	I feel relieved when I use PSS
The process of choosing and using PSS makes me feel eager	(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)	The process of chose and using PSS brings me serenity

IDENTIFICATION

Gender:	() Female () Male
Age:	() Younger than 24 () between 24 and 35 () older than 35
Education (full or incomplete):	() High School () Bachelor () Graduate
Have you ever consumed use-oriented PSS	() Yes () No

3

4

5

6

Appendix B - Descriptive Statistics

Dependent Variables	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	P&S	T&R	O&E
1 - Peacefulness	5.370	1.288	-0.320	0.560	1																	
2 - Contentment	5.490	1.302	-0.590	0.050	.676	1																
3 - Unconcern	5.010	1.666	-0.680	0.260	.567	.526	1															
4 - Joy	5.458	1.353	-0.780	0.480	.567	.546	.541	1														
5 - Trust	5.370	1.351	-0.930	0.770	.546	.559	.652	.515	1													
6 - Pride	5.542	1.365	-0.950	0.900	.425	.379	.447	.498	.491	1												
7 - Sympathy	5.813	1.170	-0.560	0.960	.511	.576	.508	.622	.456	.508	1											
8 - Welcomed	5.448	1.265	-0.450	0.480	.440	.432	.473	.398	.480	.520	.479	1										
9 - I love to find	5.323	1.126	0.050	0.800	.517	.541	.396	.583	.474	.436	.603	.471	1									
10 - Optimism	5.589	1.084	-0.420	0.410	.554	.489	.472	.553	.506	.381	.551	.440	.531	1								
11 - Enthusiasm	5.349	1.058	0.120	1.220	.512	.540	.422	.524	.466	.403	.526	.446	.675	.617	1							
12 - Posit. Surprise	4.891	1.025	0.490	0.450	.489	.490	.431	.442	.506	.582	.477	.453	.412	.460	.402	1						
13 - Passion	5.328	1.350	-0.690	0.210	.364	.339	.267	.493	.359	.338	.423	.264	.592	.411	.532	.279	1					
14 - Relief	5.344	1.297	-0.680	0.720	.460	.446	.526	.425	.477	.539	.444	.385	.374	.452	.295	.553	.476	1				
15 - Serenity	4.885	1.317	-0.090	0.030	.352	.307	.368	.420	.342	.352	.436	.433	.535	.513	.544	.343	.545	.406	1			
Cronbach's alpha																				0.659	0.835	0.857
AVE																				0.3	0.5	0.4

CR

90	09	77
0.6	0.8	0.8
55	36	62

Note: SD = Standard Deviation; Skewness and Kurtosis reference values for normality are between -2.0 and +2.0. Acronyms: P&S = Construct Peace and Serenity; T&R = Construct Trust and Relief; O&E = Construct Optimism and Enthusiasm; AVE = Average Variance Extracted; CR = Composite Reliability.

Independent Variable	Description	Quantity (%)		Independent Variable	Description	Quantity (%)
COVID-19	Pre-COVID-19	100 (52.1%)		Age	Under 24	70 (36.5%)
	Amid-COVID-19	92 (47.9%)			Between 24 and 35	72 (37.5%)
PSS use	Yes	101 (52.6%)			Older than 35	50 (26.0%)
	No	91 (47.4%)		Education level	High school	28 (14.6%)
Gender	Male	93 (48.4%)			Bachelor's degree	104 (54.2%)
	Female	99 (51.6%)			Graduate course	60 (31.3%)

Note: n = 192 respondents