Proceedings
NeuroIS Retreat 2020

Virtual Conference | June 2-4 | www.NeuroIS.org

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Adriane Randolph, Thomas Fischer (Eds.)

Proceedings of the NeuroIS Retreat 2020: Abstracts.
The final proceedings will be published by Springer.

How to Measure Customers' Emotional Experience? A Short Review of Current Methods and a Call for Neurophysiological Approaches

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Abstract. In the digital age, retailers compete through various sales channels, both online and offline, with the effect that the customers' experiences have increasingly gained attention in the omnichannel era. Specifically, customer emotions have become an important topic, because they affect attitudes towards products and services as well as purchase decisions. While the phenomenon of customer experience is widely researched, surprisingly, to the best of our knowledge, no peer-reviewed journal publication exists that has studied the phenomenon from a NeuroIS angle. Against this background, we conducted a short literature review to obtain an overview of NeuroIS methods used to study customer behavior in a shopping and retailing context. Further, we outline a brief research agenda, thereby addressing the possible use of NeuroIS approaches in the context of customers' emotional experiences in retail.

Keywords: Customer Experience, NeuroIS, Retail, Emotions

1. Introduction

Due to newly available channels to shop, including the internet, augmented reality, and smartphone apps, there is a need for retailers to provide a so-called omnichannel experience through the integration of various shopping channels [1–3]. Further, a flawless customer experience (hereafter CX) is said to be one of the keys for successful future retailers, hence, it is crucial for retailers to learn about the drivers of such an experience [4]. Hence, to better manage CX, it is critical for retailers to develop an in-depth understanding of CX to increase satisfaction and to optimize retail efforts [4, 5].

In the early 1980s, Holbrook and Hirschman [6] made the point that buying decisions are not only based on logical thinking. Since then, the knowledge and the interest in the personal determinants of CX have grown steadily [5]. More recently Lemon and Verhoef [4], for example, defined CX as "a multidimensional construct focusing on a customer's cognitive, emotional, behavioral, sensorial, and social responses to a

firm's offerings during the customer's entire purchase journey" (p. 71). Hence, CX is multi-dimensional, yet, the literature on the conceptualization of CX is both diverse and fragmented [7].

Another issue frequently raised by researchers is the lack of a robust measurement of CX in combination with an explicit call for neuroscientific approaches in CX and emotion research [4, 8]. A recent literature review analyzed 45 retail CX research papers and, after examining 22 empirical studies in detail, concluded that emotions play a particular role for CX, and, that the research domain is dominated by self-report measures [7].

Yet, since self-report measures might not be able to properly measure emotions [9], the purpose of the present study is to review the literature to gain a better understanding of NeuroIS methods used to measure a customer's emotional retail experience. We hope that the findings of this research inspire new CX research under consideration of NeuroIS approaches.

2. Customer Experience and Emotions

Palmer [10] points out that CX can either be seen as a noun, highlighting the *outcome*, the retrospective, of the participation in an event or activity, or it can be seen as a *verb*, highlighting the feelings and involvement during the actual event or activity. Building on a recent literature review on the nature of CX [7], it can be concluded that there is no clear understanding of what an experience is and how it is best measured. In their conceptualizations, CX researchers included a vast majority of factors from retailer-related factors (e.g., atmospheric store experience, product presentation, and social experience) as well as various psychological factors (e.g., cognition). Yet, emotion-related concepts were the most studied factors in this context [7]. Just to name a few examples, researchers included the hedonic [11], the affective [12, 13], or an overall emotional experience [14]. Note: We are aware of the different meanings of the terms *emotion, affect, feeling* ([9], see also [15]), yet most of the reviewed literature used the terms interchangeably.

Bosnjak, Glasic and Tuten [16], for example, conducted a CX study in the context of online shopping, and they concluded that the affective involvement was a significant determinant of the willingness to shop online, while cognitive involvement was not. To learn more about the particular emotions researched, we extend the previously mentioned literature review by Hermes and Riedl [7] and reviewed the 22 empirical studies with a pure focus on emotions. Please refer to Table 1 for a list of studies and the studied emotions. We used a seminal classification of positive and negative emotions by Laros and Steenkamp [17] to search for and classify emotions during this review. We only looked at emotions mentioned as a construct to operationalize CX. First, we reviewed emotions listed in the research framework under CX subconstructs like *feel*, *hedonic, emotional* or *affective experience*. Yet, when there was no such specific construct, we reviewed all constructs operationalizing CX. In case the framework did not provide enough information, we expanded the search to, for example, survey designs (e.g., [18, 19]). We further made small word adjustments to classi-

fy the emotions in the schemata of Laros and Steenkamp [17] (e.g., *ease of navigation* [20] classified as *at ease* [17]; *Peace of mind* [21] as *Peaceful* [17]; *playfulness* [22] as *playful* [17]). Three papers did not include or specify specific emotions [23–25].

Table 1. List of emotion words used to operationalize CX in retail

Authors	Context	Emotion word by [17]	Positive (+)/ negative (-) emotions	Count
[20, 26–30]	Online, In-Store, Virtual	Enjoyment	+	6
[11, 12, 31–34]	In-Store, Online, Smart	Excitement	+	6
[11, 13, 14, 26, 32]	In-Store, Online, Smart	Entertainment	+	5
[12, 13, 26, 31]	In-Store, Online	Pleasure	+	4
[12, 20, 26]	Online	At ease	+	3
[28, 29, 31]	Online, Virtual, In-Store	Curiosity	+	3
[26, 34]	Online, Smart	Arousal	+	2
[12, 34]	Online, Smart	Calm	+	2
[11, 35]	In-Store, Smart	Comfortable	+	2
[18, 33]	In-Store, Mobile	Frustration	-	2
[21, 33]	In-Store	Peaceful	+	2
[19, 22]	Online, Mobile	Playful	+	2
[12, 34]	Online, Smart	Relaxed	+	2
[12]	Online	Annoyance	-	1
[18]	Mobile	Confused	-	1
[12]	Online	Content	+	1
[18]	Mobile	Disappointed	-	1
[20]	Online	Distrust	-	1
[18]	Mobile	Optimism	+	1
[18]	Mobile	Relief	+	1
[18]	Mobile	Satisfaction	+	1

Twenty-one emotions were revealed, as indicated in the third column in Table 1, of which sixteen were positive and five were negative (fourth column). The most researched emotions were enjoyment, excitement, entertainment, pleasure, at ease, curiosity, arousal, calm, comfortable, frustration, peaceful, playful, and relaxed. Thus, we conclude that positive as well as negative emotions play a central role in CX research, yet, researchers mostly consider positive emotions.

3. Measurement of Experiences in Consumer Behavior

To learn more about possible studies using NeuroIS tools when researching retail customer behavior in the context of CX, we conducted a literature review. We used the general keywords “customer experience“ AND “emotion*” AND “neuro*”. To find specific keywords for commonly used NeuroIS tools we consulted a recent Neu-

roIS review paper [36]. The most used NeuroIS tools in this review were: eye-tracking, electroencephalography (EGG), functional magnetic resonance imaging (fMRI), as well as the measurement of heart rate, blood pressure, skin conductance (electrodermal activity, EDA), and hormones. Additionally, we included facial electromyography due to its importance in emotion research [37]. Hence, we used the search queries "customer experience" AND "emotion*" AND "eye* / heart* / facial* / EGG / electroencephalography / fMRI / functional magnetic resonance imaging / blood pressure / skin / hormones / EDA / electrodermal" in the database *Web of Science*. To strengthen the focus on specific NeuroIS papers, we also searched for papers with the word "emotion*" in the title in the existing NeuroIS Retreat proceedings (2009-2019). We identified a total of 62 papers from which 56 were eliminated because they did not use NeuroIS tools, or did neither focus on consumer/shopping behavior nor on CX. Hence, we identified five studies and one literature review (see [38] which reviews the use of EDA measurement in customer emotions research).

Table 2: Customer behavior in retail research papers applying NeuroIS methods

Paper	Organism Responses	Outcome	Methods
[39]	Affective liking value, affective wanting value, cognitive liking value, cognitive wanting value	Beverage Preference, Product market success	Facial valence, self-report
[40]	Visual attention, pleasure, emotional arousal	Consumer (product) choice	Eye-tracking, skin conductance, self-report
[41]	Arousal, valence	Brand perception	IAT, Eye-tracking, Galvanic skin response, self-report
[42]	Arousal, valence, admiration, like, happiness, dislike, disagreement, disgust, and neutral	Poduct appreciation	Facial expressions, self-report
[43]	Image appeal, enjoyment, perceived social presence	Attitude towards online shopping site	Eye-tracking, self-report

Observing customer's liking and wanting when choosing one of two products, Ahn and Picard [39] used facial valence and self-reports to predict beverage preferences and market success. In another study, Guerreiro, Rita and Trigueiros [40] use eye-tracking, skin conductance, and self-reports. They conclude that attention and arousal were important markers when predicting product choices. The researchers also call for the use of physiological measurements in the domain of customer behavior. Kindermann and Schreiner [41] used the implicit association test (IAT) and measurements of pupil dilation, eye blinks, and skin response to study brand perception. Further, Popa et al. [42] study arousal and eight other emotions through facial impressions in the context of emotions toward products. Wang et al. [43] use eye-tracking to study the emotional shopping effects of human images as visual stimuli on B2C websites (with product types as moderator). Altogether, as shown in Table 2, only a very limited number of studies have used facial measurements, eye-tracking, and skin

conductance to measure emotions in a brand and shopping-related context. Other methods, related to both brain activity measurement and autonomic nervous system activity measurement (for an overview, see Chapter 3 in [37]), have not been used so far.

4. Discussion, Implications, and Future Research

With the increasing number of shopping channels, CX grows in importance for retailers. While emotions play a crucial role in the CX literature, the field is still dominated by survey research [7]. Our literature review revealed only a few studies applying NeuroIS tools (e.g., eye-tracking, skin conductance), we also found that research mostly focused on product, brand, or specific website experiences and not on omnichannel experiences as a whole. Hence, we call to deepen the research in this domain including the comparison of multiple channels along the whole customer journey.

Emotions are crucial to CX, yet, as demonstrated in this short review, the use of NeuroIS tools to examine CX is still rare. This is in line with findings from other researchers (e.g., dominance of surveys and questionnaires in the CX literature [7] as well as in IS research in general [44]). However, this finding is surprising considering that some researchers argue that emotions cannot be communicated properly [9]. Additionally, various researchers also made an explicit call to widen emotions research using NeuroIS methods [15, 36, 37, 45–47].

The NeuroIS community, as well as other scientific communities, should expand CX research to physiological measurements such as heart rate or heart rate variability, skin conductance, and other measures related to autonomic nervous system activity measurement [15, 36, 37, 45–47]. It follows that we propose the following research question: How can we utilize NeuroIS methods to collect unbiased data on emotional CX? As highlighted in Chapter 2 of this paper, a wide range of emotions play a crucial part in the individual CX process. Methods that allow to identify or cluster emotional CX responses into positive and negative states are, hence, especially important for CX research. In particular, we recommend to use NeuroIS tools like a combination of facial muscular movement and eye-tracking with pupil dilation to learn more about the roles of different emotional states during a customer's experience in digital contexts [37]. Further, using Walla and Koller's [48] Startle Reflex Modulation (SRM, eye-blink amplitudes) as well as skin conductance measurements could reveal valuable information on the role of stress and arousal during CX [37].

Another finding from our research was that none of the reviewed papers had considered the effects of psychological factors like personality on emotional CX. This is surprising since we know from other customer behavior studies in the retail domain (e.g., the Big Five and its influence on the willingness to shop online [16], or the influence of the Big Five traits on internet use, e-selling and e-buying [49]) that personality is an important factor predicting channel choice and shopping behavior, likely mediated by customer emotions. Thus, our causal logic that we suggest to empirically examine in future studies is: Personality (e.g., neuroticism) → Emotional Response (e.g., distrust or stress) → Shopping behavior (e.g., rejection of an offer).

Hence, we propose the following research question: Does, and if so how emotional CX (e.g. distrust or stress) mediate the relationship between stable psychological factors (e.g. personality) and shopping behavior?

Despite the fact that we believe that our work provides value to the NeuroIS community, we emphasize limitations. The first limitation of our work concerns the process of the literature review. Our keyword list might not have involved all possibly relevant keywords and in not all possible constellations. Another limitation is that only one database (Web of Science) was examined. It follows that future research should extend the keyword list and also consider additional databases.

Acknowledgments

This study has been conducted within the training network project PERFORM funded by the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement No. 765395. Note: This research reflects only the authors' views. The Agency is not responsible for any use that may be made of the information it contains.

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