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Book

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Małgorzata Budzanowska-Drzewiecka
Adrian Lubowiecki-Vikuk



EXPLORING EMOTIONS IN CUSTOMER EXPERIENCE RESEARCH



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Exploring Emotions in Customer Experience Research

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Exploring Emotions in Customer Experience Research

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Preface

Customer experience has attracted much attention from researchers and practitioners. The interest in this concept stems from continuous changes in consumer behaviour and, more broadly, in the corporate environment. This necessitates updating and systematising knowledge and discussion about the principles for designing holistic customer experiences, especially since customer experience research is still fragmented and full of contradictions.

One of the main components of customer experience is emotions. Thus, there is a need to capture them in the entire customer journey. This book offers insights into the role of emotions in customer experience and the ways of measuring them. The book has four parts, consisting of three chapters each. Parts I and II describe the theoretical background. Chapters 1–3 synthesise the key findings on a holistic customer experience, which comprises three basic stages of the consumer journey, that is, pre-purchase, purchase and post-purchase. This provides a starting point for a discussion of the role of emotions in customer experience and a presentation of our conceptual model of customer experience management. Chapters 4–6 describe the main approaches to defining and measuring emotions in customer experience research and the challenges associated with this, especially those related to the development of artificial intelligence. Investigating the role of emotions in customer experience is a fascinating, complex and challenging research task requiring a conscious choice of the research approach. Thus, Chapter 5 offers a review of basic subjective and objective measures, which allow for capturing and recognising various customer emotions. Parts III and IV (Chapters 7–9 and 10–12) present the results of our proof-of-concept research, employing various approaches to measuring mixed emotions in customer experience. Study 1 (in Part III) is based on measuring emotions with the use of typical subjective measures (self-report measures) among consumers of aesthetic medicine and plastic surgery services throughout the entire customer journey. Study 2 (in Part IV) describes an example of employing objective measures for emotion recognition based on facial expressions with the use of FaceReader software. In this case, we refer to the second stage of the journey experienced by spa service customers. The results and our experience with these studies form the basis for a discussion

about theoretical issues and practical recommendations associated with the use of emotion measurement methods in a holistic customer experience.

This book is addressed to academics, students of many specialisations, especially in marketing, management and business, and also practitioners interested in measuring emotions when designing and managing a holistic customer experience, which requires deeper insights into consumers' emotional responses.

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Introduction to *Exploring Emotions in Customer Experience Research*

In the current competitive business environment, offering goods and services is no longer sufficient. Customers are seeking unique consumption experiences during the customer journey (Cachero-Martínez & Vázquez-Casielles, 2021; Grewal & Roggeveen, 2020). Customer experience is one of the key concepts in the literature on marketing and consumer behaviour (e.g., Batat, 2020, 2022a; Klaus, 2015; Lemon & Verhoef, 2016; Sharma et al., 2023). It is part of the inquiries in the field of experience science, the latter being a stream of multidisciplinary research that aims to provide a theoretical framework for deepening our understanding of how human experiences are formed (Chen et al., 2024). It exists at the intersection of various scientific fields and disciplines, such as engineering and technical sciences, philosophy, cognitive science, psychology, behavioural economics, or management, including marketing and consumer behaviour (e.g., Caruelle et al., 2024; Kacprzak & Hensel, 2023; Köninger & Gouthier, 2024; Jaakkola et al., 2022). The literature clearly shows that customer experience research is dominated by representatives of social sciences.

Customer experience theory, research and practice are focal issues in a growing area of experience marketing or experiential marketing (e.g., Batat, 2020; Homburg et al., 2017; Kotler et al., 2023; Same & Larimo, 2012; Schmitt & Zarantonello, 2013). Despite customer experience referring originally to the service industry, it has today become vital for different businesses around the world (Batat, 2020). This phenomenon, which is increasingly gaining attention from both practitioners and academics, is still a fairly novel (Jain et al., 2017) and relatively underdeveloped area (Schmitt & Zarantonello, 2013). Previously, service research focused on evaluating service quality; today, customer experience is considered to be of utmost importance to organisations (Kandampully et al., 2023; McLean & Wilson, 2016). Understanding customer experience is a key goal of marketing efforts and the main challenge in today's marketing research and practice. Therefore, it is urgent to develop holistic customer experience measures referring to the various touchpoints in customer journeys (Gahler et al., 2023).

The fact that customer experience applies to the entire customer journey creates the need for a holistic approach to the phenomenon, including the stages before, during and after purchase/consumption (Lemon & Verhoef, 2016). This is a challenge for service providers, as they need to capture customer experiences across multiple channels and touchpoints. This requires measuring customer experience as the basis for managing it. Customer experience refers to the ‘customer’s subjective, directed, and multidimensional responses to the interactions at the touchpoints in a whole customer journey stage’ (Gahler et al., 2023, p. 194). Thus, it refers to the consumer’s emotional reactions to any contact with the service provider, at multiple touchpoints throughout the entire customer journey (Klaus, 2015; Kumar et al., 2023; Lemon & Verhoef, 2016; McColl-Kennedy et al., 2015).

It is of paramount importance for practitioners to know the factors and dimensions that shape unique customer experiences. Emotions are an essential dimension of customer experience. The literature on emotions in customer experience is scattered among various disciplines, mostly psychology, marketing and consumer behaviour and service management (e.g., Gao & Zhang, 2024). Defining, measuring and analysing emotions are challenging tasks (Volo, 2021), especially since the word ‘emotion’ has multiple meanings. The role of emotions in customer experience has not yet been sufficiently explored (Arici et al., 2022), even though the study of emotions is an important area of research in psychology, marketing, consumer behaviour (Gaur et al., 2014) and customer experience (Havlena & Holbrook, 1986; Manthiou et al., 2020).

To advance the understanding of the role of emotions in customer experience, it is necessary to develop methods and techniques for measuring and recognising them in holistic customer experience research. However, the literature on this subject is still insufficient. Measuring emotions in customer experience is a difficult and unexplored task. The existing methods, as well as the newly introduced techniques, are not able to capture emotional states before, during and after purchase or consumption (Manthiou et al., 2020), especially when the focus is on mixed emotional states in a holistic consumer experience, and not only on positive or negative emotions. Mixed emotions play a key role in consumer behaviour (e.g., Penz & Hogg, 2011; Wang et al., 2021), particularly in explaining consumer behaviour in the service industry. However, present-day research seldom analyses emotions in consumer experience, with inquiries into consumers’ mixed emotions in a holistic consumer experience being even less frequent (Manthiou et al., 2020). Most methodologies disregard emotions and focus on the quality of service or the attitude of the consumer towards the service. Thus, an integrative review of approaches that capture emotions in a holistic customer experience is required and essential.

This book explores the importance of emotions in customer experience. It offers insights into the role of emotions in customer experience and helps

to understand the dilemma of capturing mixed emotional states in customer experience research. The goals of this book are twofold. First, it shows the value of emotions in designing and managing a holistic customer experience. Second, it critically analyses the methods and techniques used for measuring and recognising emotions in customer experience research.

In this book, we combine theory and practice. Parts I and II are theoretical and help to understand the importance of emotions in a holistic customer experience. Chapters 1–3 introduce the subject of a holistic customer experience. These chapters present the key findings on a holistic customer experience, which comprises three basic stages of the consumer journey, that is, pre-purchase, purchase and post-purchase. This provides a starting point for a discussion of the role of designing and managing customer experience and presents our conceptual model of customer experience management. In Part II, Chapters 4–6 discuss the conceptualisation and measurement of emotions in customer experience. In particular, they critically systematise approaches, methods and techniques for measuring emotions in customer experience research. Customer experience researchers, like emotion researchers, use two main approaches to measure emotions (or mixed emotions) in different stages of customer experience (before, during and after purchase). Both approaches allow researchers to capture mixed emotional states felt by consumers (e.g., Gerhart & Oh, 2024; Hadinejad et al., 2021; Oh & Tong, 2022). However, every approach has its advantages and disadvantages, as well as guiding principles. Therefore, this book presents these guiding principles for planning customer experience research using subjective and objective emotional measures and discusses the challenges facing researchers. These principles are formulated based on our experience from two research projects.

Parts III and IV are empirical in nature and describe the results of two proof-of-concept research projects measuring mixed emotions in customer experience. Apart from the research results, the book offers practical guidelines arising from these two case studies. In order to present the potential and limitations of different methodological approaches to measuring emotions in customer experience, we focused on services considered in various service environments. Study 1 (Part III) explores consumer emotions related to the experience of aesthetic medicine and plastic surgery services. This case shows the possibilities of using subjective tools, that is, traditional self-report and retrospective (ex-post) questionnaire-based measures, to capture mixed emotions in a holistic customer experience. It is based on the extended EXQ scale originally developed by Klaus (2015). The Customer Experience Quality (EXQ) scale (Kuppelwieser & Klaus, 2021) was adopted, revised and supplemented with items referring to mixed customer emotions. Study 2 (Part IV) focuses on health services provided by spa facilities (e.g., a spa hospital). In this study, we adopted an objective approach (derived from consumer neuroscience) to

recognise and measure emotions in customer experience research (FaceReader software). In both cases, in order to compare the course of the studies and their results, we adopted the categorical/modular approach to operationalise emotions, using Ekman's basic emotions (Ekman, 1971; Ekman & Friesen, 1969, 1971). Moreover, we carefully selected the measurement methods tested. Given the multitude of existing approaches and methods for measuring emotions, we followed specific selection criteria. First, the approach (measurement tool) had to ensure methodological rigour. Second, the instrument had to measure mixed emotions in a way consistent with the adopted method of emotion operationalisation. Third, the instrument had to be fit for use in a holistic customer experience.

This book fills a gap in the customer experience literature pertaining to the measurement and recognition of emotions. It provides an excellent resource for those wishing to broaden and consolidate their knowledge of emotional approaches to customer experience design. The book will enable the reader to analyse these key elements of customer experience necessary for applying an innovative approach to managing customer experience and is addressed to all readers interested in how to explore emotions in customer experience.

PART I

Holistic customer experience: from design to management

Introduction to Part I

Customer experience is one of the main subjects of research and discussion in business practice and academia (e.g., Becker & Jaakkola, 2020; Klaus, 2023; Lemon & Verhoef, 2016; Mishra, 2024; Sharma et al., 2023). This interest stems from changes in customer behaviour and expectations, driven by the increasing complexity of channels, interactions and choices in the customer journey. This leads to a change in customer approach from product/service-oriented to experience-oriented (Lemon & Verhoef, 2016). As a result, businesses, especially service companies, need to change their orientation towards customers. Some of them, that is, experience-centric companies, focus their activity on customer experience management. This allows them to build competitive advantage by offering utilitarian and hedonic values to the consumer (e.g., Arkadan et al., 2024; Clatworthy, 2019; Ponsignon, 2023). For companies like these, shaping customer experience is recognised as a new paradigm in marketing (e.g., Batat, 2020; Holbrook, 2018; Kotler et al., 2023; Schmitt, 1999). Thus, companies seek to offer consumers a unique experience.

Despite all this interest, the concept of ‘customer experience’ is still ambiguous. The majority of researchers agree that customer experience comprises cognitive, affective, physical, sensorial, social and symbolic dimensions. These are present in all the stages of the consumer decision-making and consumption process: pre-purchase, purchase and post-purchase (Jain et al., 2017; Lemon & Verhoef, 2016). Experience understood in this way is referred to as a holistic customer experience (e.g., Schmitt & Zarantonello, 2013; Verhoef et al., 2009).

Providing consumers with a unique experience requires consideration of the needs and expectations of both businesses and customers. Therefore, it is worth understanding how to manage customer experience throughout the entire customer journey, trying to reconcile the interests of both these parties. Part I offers a synthetic view on customer experience and provides a theoretical framework for a holistic customer experience, its dimensions and elements. It focuses on designing and managing customer experience, which is of key importance for experience-centric companies. Good practices of customer

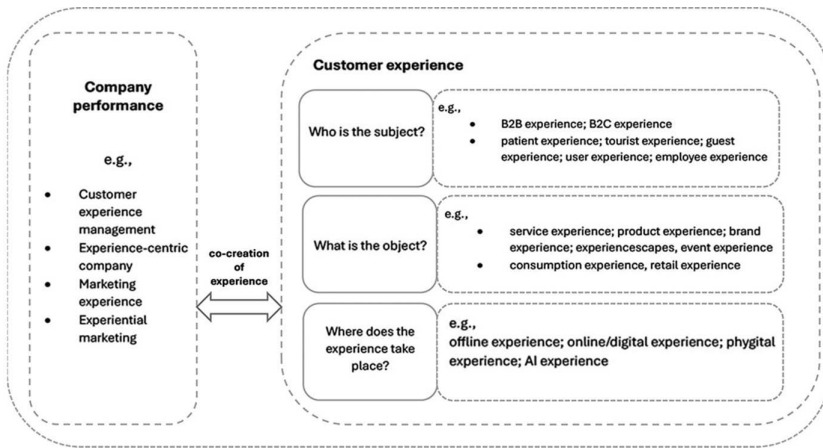
experience design include its measurement. This part of the book also presents the basic methods and tools used for designing and measuring a holistic customer experience. Experience service forms the basis for these considerations. To integrate the knowledge derived from customer experience research, we propose a model customer experience management approach.

1. Holistic customer experience: a theoretical framework

Customer experience is one of the key concepts in the literature on marketing and consumer behaviour (e.g., Batat, 2022a; Chaney et al., 2018; Lemon & Verhoef, 2016). In general, customer experience pertains to ‘everything’ the consumer encounters. Woodward and Holbrook (2013) have even stated that ‘all experiences are consumption experiences’.

Despite the advances in customer experience research, this field is still in its infancy (e.g., Klaus, 2023; Kuppelwieser & Klaus, 2021; Lemon & Verhoef, 2016). This is due to a number of reasons. First, researchers have different ways of conceptualising customer experience and rarely integrate their results with previous findings. Second, there is a clear terminological confusion due to research fragmentation and its contextual orientation. A decade ago, Schmitt and Zarantonello (2013) distinguished five areas of customer experience research, emphasising their differing orientation. These are: consumer experience; offline and online experience; consumption experience; service experience; and brand experience. However, this list is not fixed given the changing market trends and directions and, in particular, the development of new technologies and digital platforms. Some of the studies focus on the customer’s perspective, thereby emphasising different categories of experience and proposing contextually embedded terms. The areas of analysis in this approach can be grouped into three categories: subject; object; and channel (Figure 1.1).

Researchers analysing customer experience from the customer’s perspective focus on the subject of experience, that is, the type of customer who undergoes a given experience. For example, this can be a patient (Godovykh & Pizam, 2023; Klaus, 2018) or a user. This latter type of subject has contributed to the popularisation of the term ‘user experience’. It refers to consumer reactions associated with experiencing digital products, applications or websites. Customer experience can also refer to the object of experience. As a result, it is often replaced with terms like ‘service experience’ or ‘product experience’. The object can be emphasised by mentioning the name of a given sector or industry, for example, fashion retail experience (Alexander, 2024). Another group of terms and the research associated with them underscore the channel in which experiences occur. Recently, researchers and practitioners have been focusing on exploring ‘online experience’ (Kacprzak & Hensel, 2023)



Note: B2B = business to business; B2C = business to consumer.

Figure 1.1 Key analytical perspectives in customer experience research

and ‘AI experience’ resulting from the capabilities of systems based on artificial intelligence (AI), for example, next-generation chatbots (e.g., Grundner & Neuhofer, 2021; Nguyen et al., 2022). Customer experience research is also conducted from the perspective of experience-managing companies and experience co-creation in which the main focus is the way customers co-create consumption experience and the relationships they have with the company, its employees and other consumers (Kim & So, 2022). What is important from the company’s perspective is the design and management of customer experience. Research in this area pertains to customers’ responses to marketing stimuli which attract, delight and retain customers (Jain et al., 2017) or are closely related to the individual stages of consumption (Becker & Jaakkola, 2020).

DEFINITIONS OF CUSTOMER EXPERIENCE

Researchers have not yet reached a consensus regarding the definition of ‘customer experience’ (e.g., Becker & Jaakkola, 2020; Jaakkola et al., 2022; Palmer, 2010). Becker and Jaakkola (2020) have been critical of the definition-related and theoretical confusion related to the concept. In addition to the discrepancies stemming from study-specific contexts, these authors noticed that there are differences in how researchers understand the nature of customer experience.

The term ‘experience’ was introduced into the literature by Abbott (1955, p. 40), who stated that ‘what people really desire are not products but satisfying

experiences'. In turn, Holbrook and Hirschman (1982, p. 132) argued that when explaining consumer behaviour, it is important to take into account experiences that involve 'consciousness with a variety of symbolic meanings, hedonic, responses, and aesthetic criteria ... and consumption experience is a phenomenon directed toward the pursuit of fantasies, feelings, and fun'. Moreover, Hirschman and Holbrook (1982) indicated that one of the main components of the consumption experience is emotional arousal. These authors are recognised by most modern researchers as the creators of the concept of customer experience (Cavalcanti, 2022; Holbrook, 2018). Their research has contributed to the creation of an experience paradigm in the conceptualisation of the economy, especially in the service sector. Working on this concept, Pine and Gilmore (1998) treated experience as something separate from the product. In other words, customers purchase experience to enjoy unforgettable moments while shopping or consuming services. The advancements in customer experience research are reflected in Schmitt's definition (1999, p. 57): 'experience occurs as a result of encountering, undergoing or living through things. Experience provides sensory, emotional, cognitive, behavioural and relational values that replace functional values.' A broad view of customer experience is presented in the definition by Homburg et al. (2017), who say that it encompasses affective, cognitive, relational and behavioural responses at different times of contact (pre-purchase, purchase and post-purchase) during the course of co-occurring experiences. According to Jain et al. (2017), customer experience is a holistic interactive process, facilitated through cognitive and emotional clues, moderated by customer and contextual characteristics, resulting in unique and pleasurable or unpleasant memories. In turn, Becker and Jaakkola (2020, p. 637) state that 'customer experience should be defined as non-deliberate, spontaneous responses and reactions to particular stimuli'. At the same time, they question the validity of defining customer experience in relation to evaluation concepts, that is, consumer satisfaction with product purchase or perceived service quality, which had been recognised as a significant sub-dimension of customer experience (Klaus, 2015; Lemon & Verhoef, 2016). Customer experience comprises a number of different interactions between the customer and the company or brand and the associated emotions experienced at multiple touchpoints throughout the customer journey (e.g., Bueno et al., 2019; Klaus, 2015; Klaus & Maklan, 2012, 2013; Kumar et al., 2023; Lemon & Verhoef, 2016). The customer journey is a process that consumers go through before, during and after purchase or service consumption, and which comprises a series of touchpoints (Lemon & Verhoef, 2016). It is considered a cyclical and dynamic process in which past experiences can influence future ones (Klaus, 2018; Lemon & Verhoef, 2016). Thus, Gahler et al. (2023, p. 194) define customer experience as a 'customer's subjective, directed, and multidimensional mental responses to an interaction with an experience partner at a touchpoint in a customer journey stage'.

Despite these definitional discrepancies, there is a consensus in the subject literature as to the idiosyncratic, subjective and contextual nature of experiences (Agapito & Sigala, 2024). Customer experience is commonly understood as the consumer's response to a product or service and the effect of this response. When defining customer experience, it is difficult to ignore consumer subjectivity, which stems from the pre-evaluative nature of experience (Becker & Jaakkola, 2020). It is through consumers' evaluations that the impact of stimuli on their experience can be determined. Ultimately, it is these evaluations that reflect whether customers perceive a given experience as ordinary and/or extraordinary. Moreover, given the spectrum of experience, its evaluations may differ, which additionally stems from the customer journey. The pre-evaluative character of the customer experience definitions associated with the perceived service quality, customer satisfaction or perceived value (Becker & Jaakkola, 2020) may result from both human nature and the management perspective adopted. According to Miller (2024), customer experience 'is the mix of utility and emotional value a company brings to its customers', which means that during the journey, the customer will be constantly evaluating their experience and the relationship (interactions with the brand) (Becker & Jaakkola, 2020) through the prism of the utility and emotional value offered by and expected from a company. In turn, from the management perspective, customer experience should be strongly associated with practice. Separating customer experience from practice may result in deepened theorising and also blur key guidelines for companies, which should strive to improve process efficiency for greater customer, employee or business owner satisfaction. These processes go beyond customer service (Jain et al., 2017), despite it being an integral part of customer experience. Most companies focus on customer experience in the context of selected customer touchpoints centred around environmental stimuli, brand-initiated communication, technological interfaces, customer-to-employee interaction, customer-to-customer interaction and core service interaction (Kim & So, 2024).

In brief, the customer's and company's perspectives discussed above are reflected in the definitions of customer experience. Many of them emphasise how companies create marketing stimuli, thus encouraging customers to think, feel, act and sense, so that they maintain their relationships with the company, its brand, products, services, structure and/or employees and ultimately co-create experiences (e.g., Lemon & Verhoef, 2016; Schmitt, 1999; Verhoef et al., 2009).

To summarise, customer experience refers to 'the cognitive, emotional, physical, sensorial, and social elements that mark the customer's direct or indirect interaction with market actors' (De Keyser et al., 2015, p. 14). These interactions take place throughout the entire customer journey. This necessitates a holistic approach to customer experience. Our understanding of a holistic

customer experience is that it is the sum of subjective cognitive and affective experiences (Verhoef et al., 2009) in three stages of the customer journey: pre-purchase; purchase; and post-purchase. Therefore, we adopted the definition by Roy et al. (2022, p. 48), which describes a holistic customer experience as ‘a holistic and multidimensional construct consisting of components that are both internal (i.e., cognitive, affective, and physical) and contextual (i.e., interactions with other actors, such as employees in the service encounter) that affect customers’ subjective responses’.

DIMENSIONS AND ELEMENTS OF CUSTOMER EXPERIENCE

Customer experience has a holistic, dynamic and complex nature. What can foster its understanding is the identification of customer experience dimensions. However, as with customer experience definitions, there is a lack of consensus in this area. In their studies, customer experience researchers refer to different dimensions. For example, in the case of consumption experience, service experience or product experience, researchers usually focus on three dimensions: cognitive; affective; and behavioural (Alexander, 2024). In turn, with brand experience, the dimensional scope is much broader, including sensory, affective, intellectual, behavioural, memorable, personal, entertainment, educational, escapist and aesthetic dimensions. A review by Alexander (2024) showed that studies on retail experience analyse not only cognitive, sensorial and behavioural, but also emotional, joy, mood, leisure and distinctive dimensions.

Most researchers have recognised that customer experience has five dimensions: cognitive; affective; physical; sensorial; and social (e.g., Jain et al., 2017; Klaus, 2015; Lemon & Verhoef, 2016; Schmitt, 1999; Schmitt & Zarantonello, 2013; Verhoef et al., 2009). However, an additional sixth dimension has recently been established, namely, the symbolic dimension (Gahler et al., 2023).

Overall, customer experience dimensions are as follows:

1. Creative cognitive experiences (think) – referring to intellectual stimulation and customer learning during interactions with a company/brand.
2. Affective experiences (feel) – referring to (mostly positive) emotions, feelings and moods experienced by the customer during interactions with a company/brand, employees or other customers (e.g., Holbrook & Hirschman, 1982).
3. Physical experiences, behaviours and lifestyles (act) – referring to the customer’s perception of bodily movement and body positions during an interaction (Gahler et al., 2023).

4. Sensory experiences (sense) – referring to the customer’s sensory interactions with a company/brand.
5. Social identity experiences that result from relating to a reference group or culture (relate) – referring to maintaining the customer’s bond with other consumers (users) and company employees.
6. Symbolic experiences – referring to the customer’s self-affirmation and self-expression during interactions with a company/brand and representing a mental reflection of customer experience (Gahler et al., 2023, p. 195).

Additionally, researchers distinguish sub-dimensions of customer experience, referred to as contextual dimensions. There are several examples of these. When analysing the association between customer experience and AI, Wang et al. (2024) distinguished data capture experience, classification experience, delegation experience, social experience and anthropomorphic experience. Edvardsson et al. (2005), on the other hand, list the following dimensions of the ‘experience room’: physical artefacts; intangible artefacts; technology; customer placement; customer involvement; and interaction with employees. Yet another example would be the customer experience sub-dimensions in medical tourism: treatment quality; medical service quality; medical tourism expenses; medical tourism infrastructure; destination appeal; destination culture; ease of access (Ghosh & Mandal, 2019); as well as health value. These ultimately determine consumer satisfaction and loyalty or can influence consumer recommendations (Lubowiecki-Vikuk, 2022). Other researchers point to customer experience sub-dimensions in relation to specific touchpoints: environmental stimuli; brand-initiated communication; technological interfaces; customer-to-employee interaction; customer-to-customer interaction; and core service interaction (Lin et al., 2020). Due to the context sensitivity of touchpoints, Reitsamer and Becker (2024) concluded that it is worth considering additional sub-dimensions of customer experience, namely the design of distinctive changes in the customer journey and the design of stimuli to trigger an intended sequence of lived experiences. All these sub-dimensions do not refer to the dimensions of customer experience per se, but are rather associated with context-, subject- or channel-specific experiences analysed by customer experience researchers.

Essential parts of customer experience are content, context and qualities (De Keyser et al., 2020; Gahler et al., 2023; Lemke et al., 2011). What is meant by experience content is that every customer experience is subjective, multidimensional and directed towards customer interactions at various touchpoints in a given customer journey stage (Gahler et al., 2023). Content refers to touchpoints, including to interactions between the customer and a firm (De Keyser et al., 2020). The fact that customer experience applies to the entire customer

journey raises the need for a holistic approach to this construct, including three stages: before, during and after purchase/consumption (Lemon & Verhoef, 2016). The context of customer experience refers to an individual's interactions with a service or company through touchpoints in a given customer journey stage (specific point in time) (Gahler et al., 2023). In other words, experience context pertains to situationally available resources, that is, factors affecting the customer: internal (socio-demographic, psychographic and cultural) and external (brand-related stimuli) (Agapito & Sigala, 2024; De Keyser et al., 2020). The last element of customer experience is attributes that reflect the nature of customer responses and reactions to interactions with a firm, which De Keyser et al. (2020) refer to as qualities. It is worth emphasising that all these customer experience elements, that is, content, context and qualities, are directly or indirectly associated with consumer emotions (e.g., Liu et al., 2016), which form the basis for the customer journey (Roy et al., 2022). Some researchers believe that discrete emotions at touchpoints across the customer journey are an element of customer experience (McColl-Kennedy et al., 2019). Emotions, along with perception and cognition (Marinetti et al., 2011), form a complex holistic customer experience. Thus, knowledge of these elements is a challenge for designers and service providers, managers and researchers, whose work can support managerial practices (Klaus, 2023). What these actors need to do is to capture customer experiences across multiple channels and touchpoints, thus building competitive advantage and support for the brand/company (Kandampully et al., 2018). This necessitates adopting the customer's perspective and obtaining various types of customer data: socio-demographic data; data on customer values; attitudes, mindsets, beliefs; and lifestyles (e.g., Agapito & Sigala, 2024; Herbach, 2024).

A holistic customer experience is best reflected by the customer journey, which includes three stages: pre-, during- and post-purchase/post-consumption (Kuppelwieser & Klaus, 2021). The first, the pre-purchase stage, refers to interactions that occur before purchase and is based on the customer's perception of the company, brand or product value. The second stage refers to interactions occurring during the purchase and service provision process, often including aspects related to service quality. The third stage, in turn, pertains to customer experience after purchase and offer consumption. A holistic customer experience includes all stages of the decision-making and consumption process (Jain et al., 2017). Each of these stages can be affected by a number of various touchpoints (Baxendale et al., 2015; Lemon & Verhoef, 2016).

The term 'touchpoints' originated from the phrase 'moments of truth' (Duncan & Moriarty, 2006). Customer touchpoints refer to a product, service, people and places where the customer encounters a given company's offer. Basically, a touchpoint is 'any verbal (e.g., advertising) or non-verbal (e.g., product usage) incident a person perceives or consciously relates to a given firm

or brand' (Homburg et al., 2017, p. 384). Touchpoints are of key importance for the understanding of positive, negative or neutral customer experiences in various contexts (Jaakkola & Terho, 2021; Micheaux & Bosio, 2019). For instance, tourist experience refers to various touchpoints varying from channel to channel – online, offline or mixed – which may pertain to the customer's relationship with various tourism and tourism-related entities encountered during the three stages of consumption: before departure; during the trip; and after return (Chen et al., 2024; Irani et al., 2022). Touchpoints are critical in shaping customer satisfaction. Thus, they attract particular attention of marketers who want to improve service quality (Lemon & Verhoef, 2016). They are also important in managing the interaction network during the customer journey. Rosenbaum and Ramirez (2022) emphasise that, nowadays, touchpoints quite often relate to the customer's relationship with a company in the virtual world, with screen devices being a key tool in this interaction. Thus, touchpoints are automated and oriented towards technological efficiency. These changes result in challenges and implications for customer experience design (e.g., Kotler et al., 2023). What is interesting in this context is so-called emotional touchpoints, as their identification may help practitioners to approach both the positive and negative aspects of customer experience in a more responsible way (Dewar et al., 2010). Ultimately, this may improve the design of this type of experience (Batat, 2024b).

MEASURING A HOLISTIC CUSTOMER EXPERIENCE

In light of the growing interest in customer experience, the measurement of this construct is a topical subject for researchers. Due to the complex nature of customer experience, this is not an easy task. What complicates the matter is not only the lack of unanimity in defining customer experience, but also the multitude of the construct's sub-dimensions (Jain et al., 2017). Researchers stress the need to develop tools and indicators for measuring customer experience, so that future research could adopt a longitudinal perspective and allow for monitoring, designing and managing customer experience (e.g., Agapito & Sigala, 2024; Klaus, 2015; Kuppelwieser & Klaus, 2021; Verhoef et al., 2009). The most popular measures and indicators of customer experience used by practitioners include the transactional or relationship net promoter score, customer retention rate, customer lifetime value, brand recall and recognition rate or the User Experience Questionnaire (e.g., Clatworthy, 2019; Klaus & Maklan, 2013; Mousavi et al., 2025). However, according to Christensen et al. (2003, p. 53), the measurement of customer experience requires 'understanding a range of psychological phenomena as they occur in the daily lives of individuals'. Kuppelwieser and Klaus (2021) believe that in a perfect world, customer experience would be measured pre-purchase, during the purchase

and post-purchase. Other researchers add that the measurement should be performed at all touchpoints (Gahler et al., 2023; Reitsamer & Becker, 2024). For instance, Becker and Jaakkola (2020) would like a tool for measuring customer experience to be more dynamic and to engage the consumer in assessing the consumer journey and determining cues for individual touchpoints. The measurement of customer experience is associated with methodological issues related to the choice of dimensions (sub-dimensions) and elements of customer experience that should be included in the measures, so that it is possible to capture a holistic customer experience.

The dominant approach in customer experience research is the quantitative one, whose aim is to develop scales (e.g., Kuppelwieser & Klaus, 2021). Jain et al. (2017, p. 655) advocate the development of measures in which customer experience would be viewed 'as a formative construct as well as reflective construct'. Researchers also turn to alternative research strategies, seeking to complement quantitative measurement with qualitative measurement (mixed methods). A mixed approach using complementary methods and innovative tools is required (Agapito & Sigala, 2024; Bujisic et al., 2024), as it can contribute to a more comprehensive understanding of a holistic customer experience. However, qualitative methods are rarely applied in customer experience research. These are, for example, netnography or experience-sampling procedures, which help to understand a range of psychological phenomena that occur in the daily lives of individuals (e.g., Chen et al., 2024; Christensen et al., 2003). It should be noted that studies employing qualitative methods have been accused of subjectivity due to small research samples, for example, case studies (Kranzbühler et al., 2018), and context-specific experiences necessitating measurement of customer experience sub-dimensions.

The customer experience scales used in research often pertain to the second stage of experience only (i.e., during the experience). They are mostly context-specific. For instance, retail experience can be measured with the in-store customer experience scale (Bustamante & Rubio, 2017). This scale includes four dimensions of customer experience: cognitive; affective; physical; and social. The last one refers to both interactions with customers and interactions with employees. The authors of this scale, Bustamante and Rubio (2017), resigned from measuring emotions, stating that they are more characteristic of customer experience. Instead, the scale's cognitive dimension includes items pertaining to consumer moods. Another measure of customer experience is the scale developed by Brakus et al. (2009). However, since this is a brand experience scale, its use allows for formulating practical implications only for brand-based customer experience design. Oh et al. (2007), in turn, designed a customer experience measurement scale which is based on the experience economy model (Pine & Gilmore, 1998) and pertains to customer experience in lodging and tourism settings. According to Agapito and

Sigala (2024), studies employing this scale provide controversial results, as the instrument does not include customer experience contexts other than tourism and hospitality settings and associated touchpoints. There are also other scales measuring customer experience, for example, interview-based scales like the critical incident analysis (Hwang & Seo, 2016), or those that focus on service experience in business-to-customer, business-to-business or business-to-business-to-customer settings (e.g., G. & Asokan-Ajitha, 2023). In this area alone, 19 new measurement scales have been identified, none of which relates to the pre-experience/pre-purchase stage (Bueno et al., 2019). One of the most recent scales for measuring customer experience in services is the tool developed by Gahler et al. (2023). The authors paid attention to the channel in which experiences take place and embedded the scale in omnichannel environments. Another element characteristic of this tool is the additional (sixth) dimension of customer experience, that is, symbolic. This shows that there is no consensus among researchers about customer experience measurement. Despite the advancements in scale development, the literature does not offer many scales for the measurement of a holistic customer experience. One of the exceptions is the service experience quality scale (Klaus, 2015; Klaus & Maklan, 2012, 2013; Kuppelwieser & Klaus, 2021). Numerous researchers have used this scale to study different subjects in various contexts. Thus, there is a need to design a consensual scale for holistic customer experience measurement, which could take into account the various contexts, actors and channels present in different perspectives of customer experience research.

Tools measuring holistic customer experiences should also constitute the framework for capturing the emotional components of customer experience at different stages of the customer journey. These instruments should not be based solely on perceived quality or customer satisfaction as surrogate indicators of customer experience because, as stated by Becker and Jaakkola (2020, p. 643), this 'limits the understanding of the true nature of ... customer experience'. Furthermore, customer experience research analyses the application of different methods and techniques that allow for measuring the experience from the organisation's or consumer's perspective (Kranzbühler et al., 2018). However, to date, most methodologies have disregarded emotions and focused on the quality of service or the attitude of the consumer towards the service. Thus, an integrative review of approaches that capture the emotional components of a holistic customer experience and are adjusted to the dynamic nature of this experience is required and essential (Klaus, 2023).

2. Designing a holistic customer experience

Customer experience originally referred to the service industry. However, today it has become vital for different businesses around the world (Batat, 2020). Even though the construct has gained increasing attention from both practitioners and academics, it is still a fairly novel (Jain et al., 2017) and relatively underdeveloped area (Schmitt & Zarantonello, 2013). Thus, an apt understanding of customer experience remains a challenge for companies, especially those operating in the service sector. Service experience is one of those areas of customer experience research that provokes numerous discussions related to the benefits and dilemmas of combining different services with experience (e.g., Edvardsson et al., 2005). The literature describes service experience in various ways due to different research approaches and explanations of what services are in general. Most commonly, however, service experience is understood as ‘an actor’s subjective response to or interpretation of the elements of the service’ (Jaakkola et al., 2015, p. 186). What needs to be remembered is that customer experience is not just related to service provision (the ‘during-service’ stage). It begins long before the moment of purchase and continues long afterwards (Kotler et al., 2023). Service experience subjects may include various stakeholders (actors) associated with the service, including customers (Jain et al., 2017) and service provider representatives (Helkkula, 2011). Consequently, service experience encompasses the experiences of multiple stakeholders within the service system. Due to the experiential and relational nature of services (Edvardsson et al., 2005), service companies started to look more carefully at customer value and move towards a holistic approach to meeting consumers’ needs by offering them experience-oriented services. Customer experience has become an effective way of creating and delivering services that address the utilitarian and hedonic values of the customer (Ponsignon, 2023). The resulting service packages form the general service offer, which consists of the core service and complementary services. Experience is a unique element of these packages. In other words, as customers purchase a service, they simultaneously acquire an ‘experience’, which is created in the course of service provision (Bateson, 2002).

As services have evolved and the role and importance of experience in services have been recognised, researchers have turned their attention to customer engagement and the need for a deeper understanding of the context in which services are provided. Some of them have stressed the need for service companies to engage with the customer's daily routine so that they can learn about the customer's specific needs, and be able to like and understand them (e.g., Foglieni et al., 2018). To gain a better understanding of a holistic customer experience, we must look at it through the prism of the service design stream. It is necessary to focus on the process of creating services based on customer experience and review the available methods and tools which foster their design.

DESIGNING SERVICES BASED ON CUSTOMER EXPERIENCE

Service design stream has become the basis for designing customer experience-based services. Service design (or design for service) is usually referred to as the overall discipline and practice of designing a service (Foglieni et al., 2018, p. 20). Design for service is a special type of service design based on the latter's investigative or research and preparatory side. It defines a contextual approach to implementing new services or service innovations, emphasising the need to keep up with changes in the service market and involve customers in co-creating value (and, in effect, co-designing the service). What is important in design for service is the way of shaping experience in various settings and with numerous actors, especially customers (Wetter-Edman et al., 2014). As underscored by Foglieni et al. (2018), the essence of service design is to create service value and measure it from the perspective of the customer and the service provider in a specific context.

The design of customer experience-based services stems from a process approach to the service experience, in which the focus is placed on the architectural elements of the service delivery process (Edvardsson et al., 2005; Helkkula, 2011). This means that designing service experience may pertain to a single or all stages of the service process, in which the chronological order of the elements is emphasised, that is, (intangible) interactions of the customer with the company or brand and physical elements, such as technology and prototypes.

A key principle of experience-based service design involves looking at the service from the perspective of the customer journey and its associated touchpoints (Zomerdijk & Voss, 2010). Consequently, service designers should pay attention to three aspects: (1) pre- and post-purchase experiences; (2) physical aspects of the customer, such as managing the customer's arrival and departure; and (3) emotional aspects of the journey, such as building anticipation

and savouring the post-experience (Zomerdijk & Voss, 2010, p. 79). The first aspect of designing experience-based services pertains to the stages of customer experience. In the first stage of a holistic experience, the customer, based on their previous experiences and immediately before any interaction with the company, usually has high expectations of having their needs met. Realising the purpose of their action, the customer starts interacting with the company and moves to the second stage of the experience. Due to the numerous interactions with people (employees and other customers), objects or the environment, the customer creates their own experience. Having achieved this goal, the customer moves on to the third and last stage of the experience. The second aspect of experience-based service design refers to the interactions between physical and social service elements (e.g., Mao et al., 2024; Pullman & Gross, 2004). Here, an important role is played by socio-material configurations and institutional arrangements (Vink et al., 2021), whose aim is to seamlessly provide customers with the experiences they desire (Wetter-Edman et al., 2014). The third aspect of designing experience-based services proposed by Zomerdijk and Voss (2010) seems crucial to the design of a holistic customer experience. It involves arranging the elements of customer experience in such a way that they evoke positive customer emotions, which ultimately affects customer loyalty (e.g., Pullman & Gross, 2004).

Thus, customer experience designers face a difficult task. Driven by such values as the emphasis on a holistic approach, and the focus on empathy (Fayard et al., 2017), they are obliged to incorporate the existing information into all customer interactions with the service provider, stimulating and supporting consumer behaviour (Teixeira et al., 2012). It is assumed that a carefully designed customer path based on a dual, hedonic and utilitarian orientation (Ponsignon, 2023) hones customer experience (Zomerdijk & Voss, 2010). It allows customer experience designers to reach for the appropriate methods and tools for designing a holistic customer experience.

METHODS AND TOOLS IN HOLISTIC CUSTOMER EXPERIENCE DESIGN

Holistic customer experience design may be understood as a process of arranging all the elements of the experience, that is, content, context and qualities, in such a way that as the customer interacts with the company or brand (at multiple touchpoints), each party can achieve the desired goal, with the focus on a holistic approach and empathy towards the consumer who went through the entire customer journey (e.g., Bellos & Kavadias, 2021; Foglieni et al., 2018). The goal of designing a holistic customer experience is to take a creative and integrated approach to evoking positive experiences, engaging the consumer

to co-create these experiences and, ultimately, gaining loyal customers willing to return.

Customer experience designers have not developed many methods and tools for designing a holistic customer experience. In general, this may be due to the multifaceted nature of customer experience research, which means that the ways of monitoring customer experience are not homogeneous. In this regard, what dominates is conceptual work, derived from service design. The subject literature emphasises the need to develop proper experience design methodologies (e.g., Hwang & Seo, 2016). The available methods and tools for designing a holistic customer experience have mostly been created by practitioners and have a utilitarian character. As noted by Clatworthy (2017), Design Thinking, while essential to innovative approaches in a changing corporate environment, requires a different view of experience-oriented service through a series of interactions at touchpoints over time. This author suggests that service experience designers should use abductive logic, that is, 'look beyond what is, and explore what can be' (Clatworthy, 2019, p. 81). Therefore, the task of designers is to strive to solve difficult, often impossible problems and employ non-standard solutions.

Our literature review has shown that the methods helpful in designing a holistic customer experience include Designing for Meaningful Experiences (D₄Me) and Design Thinking. Managerial practices can also be enhanced with the use of the Graph Experience (GraphEx) hip-pocket model based on abductive thinking (Sahhar et al., 2023). It is also worth paying attention to tools that support customer experience design, such as the persona tool and customer journey mapping.

Designers and marketing professionals, especially those in experience-centric companies, can use the D₄Me method. In this approach, meaningful experiences refer to the kind of customer experiences that go beyond habitual lifestyles and pertain to the expected experience, the lived experience and the remembered experience (Clatworthy, 2023). The D₄Me method represents a structured approach to understanding customer experience embedded in a specific context. Clatworthy (2019) emphasises that consumers' affiliation with certain social groups (communities) – such as football fans, who have their own symbols (e.g., sports club scarves) and rituals (e.g., singing or feasting together) – reinforces their commitment to co-creating values and experiences. Social and cultural identity is also aligned with consumers' (fans') emotions, such as happiness and love, which influence their attachment to sports events (Prayag et al., 2020). Referring to the psychological need for fulfilment, Clatworthy (2019) points out that modern-day consumers can expect more than just the satisfaction of their own needs, because they can also actively seek common and meaningful experiences. Thus, they expect products and services that are authentic and will have a greater meaning in their daily lives. Meaningful

experience is also emphasised in the design of, for example, museum service experience (Morse et al., 2023) or elderly rehabilitation service experience (Hu et al., 2018).

Experience-centric companies, such as those that want to implement customer experience into their products or services, can use the D₄Me method in experience design, which will allow them to establish deeper connections with customers. The method consists of four stages (Clatworthy, 2019):

1. Cultural recognition and mapping – identifying market and experience elements, paying attention to aspects of social identity and cultural identity (mapping symbols, narratives, consumer concerns).
2. Transformation into meaning – making the mapped elements of the experience meaningful to the consumer.
3. Designing the service offer as a myth, with the myth being understood as a metaphor for group identity, which helps to create meaningful experiences – creating a service myth as the basis for an experience-centric offer.
4. Designing an experience-based journey as a ritual journey through meaningful interactions with services – emphasising the role and importance of the ritual that occurs during service provision, for example, hotel check-in and check-out; this stage additionally focuses on the emotions customers experience during the ritual and consumer involvement in co-creating the experience.

The D₄Me method is strongly anchored in practice. It has been successfully used to design experiences in such fields as finance, telecommunications, sports events and tourism (Clatworthy, 2019). It is characterised by the subjectivity of the design team and stems from the thinking philosophy of those companies that offer experiences as their core product/service.

Another method used in experience design is Design Thinking. It is centred on the use of an iterative creative process focused on solving ‘wicked problems’ or designing or improving products, services or experiences in a highly customer-focused manner (e.g., Buchanan, 1992; Von Thienen et al., 2018). Apart from being used in service design, Design Thinking has also been employed in, for example, graphic and industrial design (Buchanan, 1992). As its popularity grew, companies started using Design Thinking in product design, brand design and experience design. The method can also be applied in customer experience design, helping to identify and measure consumer emotions (Atakan & Soscia, 2021). Design Thinking comprises five major stages: (1) empathise; (2) define; (3) ideate; (4) prototype; and (5) test. Each of them allows the creation of unique solutions based on empathy, that is, a deep

recognition of users' needs which, at the same time, are viable for business (Liedtka & Ogilvie, 2011).

The first stage of Design Thinking is associated with seeking to understand the customer's (user's) problems and needs. Various methods and supporting tools can be used for this purpose. These include an empathy map, ethnographic interviews and user observations. The results of this stage may become an inspiration for designers of new products or services. Compilation of the research material collected helps to define the customer's problem in the second stage. Here, designers can use several techniques, such as reframing the problem, 5 Whys and axis mapping: how versus why. The third stage involves generating as many new solutions as possible for a particular problem using, for example, brainstorming. The fourth stage consists in presenting a prototype of the solution selected. In the case of services, the prototype can be the customer (user) path. In the fifth stage, the selected solution is tested in the actual customer (user) environment. If the outcome of this stage is positive, a product or service can be considered ready for final implementation.

The Design Thinking method was revised by Batat (2022b) for the design of innovative phygital customer experiences. At the same time, Batat proved that, in the case of food experiences, the Design Thinking method 'has a narrow vision and a limited perspective, which does not focus on the whole food experience' (Batat, 2021, p. 3).

Due to the fact that customer experience is a multidimensional concept, designers have problems with capturing this experience, especially from the consumer's perspective. Thus, they have to maintain a degree of simplification. What can prove useful in this situation is the GraphEx hip-pocket model offering visualisation of customer experience over time and embedded in the service context (Sahhar et al., 2023). The model, which includes graphs and illustrations, shows the valence of experience (positive, neutral/indifferent, negative), the type of experience (unreflective, reflective) and visceral intensity (the longer the experience, the more intense it is).

Depending on the valence, type of experience and visceral intensity, the GraphEx hip-pocket model defines five managerial practices: urgent patchwork; restoring; activating and stimulating desire; bolstering; and safeguarding appreciation. The aim is not only to properly manage customer experience, but also to develop marketing managers' ability to think creatively about the possible customer experience pathways (Sahhar et al., 2023).

The GraphEx hip-pocket model has been developed using an autohermeneutic phenomenological approach based on the service theory, which provides an in-depth understanding of customer experience, but only in theoretical terms. To date, there has been no empirical evidence confirming the effectiveness of the model. Furthermore, the model does not allow for describing the entire

customer journey, step by step. It is also quite a subjective tool presenting a particular customer experience associated with a specific service.

The tools for designing experience-oriented services also include the persona tool and customer journey mapping. They help researchers to answer the question, 'what is?'. These tools are used to better understand the needs of the customer, as well as to identify the (discrete) emotions of consumers and the behaviour triggered by these emotions (Liedtka & Ogilvie, 2011; McColl-Kennedy et al., 2019; Micheaux & Bosio, 2019).

Focusing on the customer, marketers have increasingly used the persona tool, which involves describing a fictional, yet realistic, hypothetical customer. The goal is to deepen the knowledge of the current and potential consumers' needs. Both marketers and customer- (user)-oriented designers collect detailed data, personify them and create typical patterns. These data are reliable, as they are sourced from companies' own databases or from commissioned quantitative studies (e.g., card-sorting, D³HDRS framework¹) and/or qualitative studies (e.g., focus groups, observation). They usually pertain to socio-demographic, behavioural and psychographic characteristics of customers (e.g., attitudes, ambitions) and their needs and concerns (current frustrations) (Micheaux & Bosio, 2019). Based on this information, marketers and designers describe a character representing a given customer (user) segment. The purpose of the tool is to increase empathy of service providers and thus allow them to build a more intimate relationship with the customer (user) (Märting et al., 2023; Schäfer et al., 2014). When using the persona tool to design a holistic customer experience, it is important to remember that the result may stereotype customers. At the same time, it has been recognised that personas work better for designing service experiences than other available methods, such as segmentation. They help to reduce design time and improve the quality of, for example, a website, an application or a new solution (e.g., Caballero et al., 2014; Micheaux & Bosio, 2019).

When designing a holistic customer experience, a key role is played by those experiences that result from visualising the archetypal customer (persona), which are then used for mapping and optimising the customer journey (Micheaux & Bosio, 2019). Thus, the persona tool is an element of both Design Thinking and a customer journey map, being an essential tool for designing a holistic customer experience.

A holistic customer experience refers to the entire customer journey, which comprises numerous customer interactions with a company or brand. While a company cannot control the thoughts and feelings of the consumer, it can influence company–consumer interactions (e.g., Sykora et al., 2022). The designing of these interactions refers to the sequence, consistency and connectivity of touchpoints across the customer journey (e.g., Micheaux & Bosio, 2019; Reitsamer & Becker, 2024; Zomerdijs & Voss, 2010). A tool that is used

to visualise specific customer (user) paths and their interactions with a company or brand is a customer journey map. Customer journey mapping helps to understand the communication between the customer and the company and the customer's thoughts, emotions, goals and motives. It is a structured and comprehensive tool for planning, recording, clearly presenting and documenting all customer interactions with the company or brand, including the holistic customer experience. The tool demonstrates individual stages of the experience broken down into sequences of events taking place throughout the journey. These sequences of events can evoke different emotional responses in customers, be it enthusiasm or frustration, at all touchpoints. It is worth noting that this tool can contain different types of information, depending on the subject, context or channel of experience. For example, it can include graphics illustrating mixed emotions of the consumer, depending on the stage of the experience. This helps designers and marketers to understand, for example, the uncomfortable situations and difficulties the customer may encounter and the ensuing customer emotions (Caruelle et al., 2024). A customer journey map offers an opportunity to identify gaps in the design of a holistic customer experience and look for creative solutions to improve the quality of service experience.

As noted by Micheaux and Bosio (2019), each customer journey may be different. A holistic customer experience in its pre-, during- and post-consumption stage is influenced by past experiences and all the touchpoints, which ultimately affects future experiences (Lemon & Verhoef, 2016; Micheaux & Bosio, 2019). Touchpoints may differ depending on the channel (online, offline or phygital) (Batat, 2022a). As a result, there is no single customer journey map template. Furthermore, touchpoints will vary depending on the subject and context of the experience. Thus, there is no single template of the customer journey-mapping procedure either. Its development is usually based on a pattern of steps that involve gathering customer information, analysing data, mapping (information transferred to a template), preparing solutions to improve the customer journey and ultimately repeating the entire cycle over again to enhance the journey (customer journey is a never-ending cycle).

Customer journey mapping usually requires the participation of an interdisciplinary project team who are going to use, for example, brainstorming. Preparing a customer journey map is associated with challenges in implementing ongoing quantitative research among customers (e.g., using a survey questionnaire). Reluctance to fill out surveys hinders the process of collecting customer information. Furthermore, some researchers perceive customer journey mapping as a tool for the initial determination of the rather obscure process of imagining the customer journey, during which designers and service providers seek tangible benefits in experience-based service design (e.g.,

Bellos & Kavadias, 2021; Fayard et al., 2017). However, the tool can also be treated as a form of support for managing a holistic customer experience.

Compared with the D₄Me method, the tool is more objectified and in line with the principles of service design (Micheaux & Bosio, 2019). Consequently, leading customer experience researchers recommend it for, for example, auditing the elements of customer experience (De Keyser et al., 2020). Since it is difficult to identify all the touchpoints in the customer journey, the task of preparing customer journey maps is not easy. Touchpoints can be company/brand-controlled and company/brand-non-controlled (De Keyser et al., 2020). Touchpoints that are not controlled by a company may (but do not have to) be controlled by the customer. Often, the customer is unable to identify them at all, which is further complicated by their emotional nature, for example, touchpoints comprising the hospital service experience (Batat, 2022a; Dewar et al., 2010). Moreover, touchpoints can be affected by peers, opinion leaders, influencers or other companies or brands (e.g., Baxendale et al., 2015; De Keyser et al., 2020; Kim & So, 2024).

The field of marketing practice provides researchers with some other tools supporting the design of a holistic customer experience, such as an experience map and/or customer voice (e.g., Liedtka & Ogilvie, 2011).

An experience map presents the entire journey that the customer goes through when interacting with a product or service. It helps to illustrate and better understand this journey. Determining the role of the competition and the company in the overall customer journey is certainly helpful in this context. Customer journey maps only deal with the path taken by the customer to make a single purchase. Experience maps, however, record any and every action of the customer and, as in customer journey maps, present stages – from the moment an individual starts searching for a product or service to the moment they become a customer.

Customer voice can be used as a stand-alone tool. However, in practice, it is employed to create a persona or an empathy map (a visual tool for an in-depth analysis of customers involved in the creation of a product or service). Liedtka and Ogilvie (2011, pp. 21–33) list yet other tools useful in customer experience design, for example, what if? (brainstorming and concept development), what wows? (assumption testing and rapid prototyping) and what works? (customer co-creation and learning launch).

Another tool that is helpful in service design is the blueprint (Lynn Shostack, 1982). Its purpose is to improve the quality of services. Creating a service blueprint involves performing an analysis of customer actions, with a breakdown of tasks to be fulfilled by a company and its partners, as well as an analysis from the organisation's perspective. The blueprint includes three levels: customer level (user actions); visible level (front stage); and invisible level (back-stage actions, support processes). The fact that experience is context-dependent

allowed Zomerdijk and Voss (2010) to transform the blueprint to match the needs of experience design in such a way as to enable companies to influence customer experience, establish an emotional bond with customers and stimulate customer loyalty. An interesting example of service experience design is the Multilevel Service Design method, which ‘offers a systemic view of service design levels and a flexible approach that accommodates the co-creative nature of customer experiences’ (Patrício et al., 2011, p. 197).

NOTE

1. A method that is helpful in creating personas is the D³HDRS framework, that is, an innovative seven-stage hierarchical clustering approach designed to quantitatively analyse customer experience feedback arranged in multiple dimensions, such as emotions, sensations, perceptions, product or service, price, promotion, distribution channels, service interface and brand interactions (see Soto-Ferrari et al., 2024).

3. Managing a holistic customer experience

Enterprises, especially service companies, treat customer experiences as an opportunity to build competitive advantage (e.g., Arkadan et al., 2024; Athaide et al., 2024; Clatworthy, 2019). They have noticed that buyers desire unique experiences during the customer journey (Cachero-Martínez & Vázquez-Casielles, 2021; Grewal & Roggeveen, 2020), which may lead to building customer loyalty and satisfaction. Therefore, companies find it essential to endeavour to influence and manage customer experiences (Homburg et al., 2017; Mansoor et al., 2020; Verhoef et al., 2009). What makes this possible is customer experience management.

Some of today's firms have become experience-centric, with the aim of creating and delivering experiences. Clatworthy (2019, p. 3) believes that experience-centric companies are those in which 'everything is subordinated to providing customers with a positive experience', and experience orientation is an imperative to their operation. Arkadan et al., in turn, describe this idea as customer experience orientation, that is, 'a strategic orientation that prioritises and institutionalises organisational learning about customers' experience appraisal as a route to superior firm performance' (Arkadan et al., 2024, p. 1561). Experience-centric companies are distinguished by values such as journey motivation, experience empowerment and continual experience optimisation. They require experience-based organisational learning through the collection, dissemination and implementation of customer experience insights. The other values followed by these companies (journey organisation, experience mandating and purpose alignment) institutionalise this learning (Arkadan et al., 2024, p. 1561).

Experience-centric orientation of companies is a relatively new approach originating from customer orientation. Customer-centric companies identify customer needs and offer products and services that the customer simply purchases. Experience-centric companies, on the other hand, focus on understanding the customer, as they are aware of the importance of customer experiences. Customers of experience-centric companies feel that their experience is important and that the company satisfies their needs. As a result, they

become loyal customers and even company ambassadors. Experience-centric companies recognise customer experience as an integral part of management, which is clearly seen in their marketing activities, that is, experience marketing (e.g., Kotler et al., 2023; Same & Larimo, 2012; Schmitt & Zarantonello, 2013) and experiential marketing (e.g., Batat, 2020; Schmitt, 1999; Smith & Hanover, 2016) and in customer service centres. This requires integrating consumer perspectives and co-creating experience in customer experience management.

CUSTOMER EXPERIENCE MANAGEMENT

The subject literature does not offer a single, generally recognised definition of customer experience management (e.g., Homburg et al., 2017; Suwelack et al., 2022). One of the first authors who introduced this term was Schmitt (2003). He believed that customer experience management is ‘the process of strategically managing a customer’s entire experience with a product or company’ (Schmitt, 2003, p. 17). Schmitt (2003) underlined that customer experience management is a five-step process, which involves analysing customer experiences, building an experience platform, designing customer experiences, structuring the experience and engaging in ongoing innovation. The latter area is particularly significant for companies, as a higher level of customer experience management sophistication translates into greater success of innovations introduced in the organisation (Athaide et al., 2024).

Customer experience management can be regarded as ‘the strategy to engineer the customer’s experience in such a way as to create value for both the customer and the firm’ (Verhoef et al., 2009, p. 38). Customer experience management refers to various contexts and actors (Kandampully, 2014), for example, employees. In customer experience management, it is important to leverage employee skills to satisfactorily serve customers, improve those skills and adopt standardisation of service processes and internal processes and procedures in managing the organisation (e.g., Sykora et al., 2022). In turn, when defining customer experience management, Homburg et al. (2017) treated it as a higher-order resource and listed three factors that affect customer experience management: (1) cultural mindsets emphasising the importance of the corporate culture; (2) strategic directions; and (3) firm capabilities. In this context, customer experience management refers to ‘the cultural mindsets toward customer experiences, strategic directions for designing customer experiences, and firm capabilities for continually renewing customer experiences, with the goals of achieving and sustaining long-term customer loyalty’ (Homburg et al., 2017, p. 384). Being practice-oriented, Lemon and Verhoef (2016), on the other hand, suggested that customer experience management should take account of the customer journey. They underscored a wide range of touchpoints in the

dynamic customer environment, whose identification would allow for optimising customer experience.

The different ways of defining customer experience management may be due to numerous factors, including the theoretical or empirical perspective adopted by researchers (Hwang & Seo, 2016). Customer experience management should focus on designing, monitoring and influencing stimuli at various customer journey touchpoints, and on supporting corporate culture in which customer experience management can develop (Jaakkola et al., 2022). In other words, customer experience management can be regarded 'as a strategic approach that involves strategically managing touchpoints throughout the customer journey and aligning this journey with the provider/firm's strategic goals' (Panina, 2022, p. 94).

It needs to be emphasised that customer experience management is often compared to customer relationship management (CRM) (e.g., Homburg et al., 2017). Some researchers wonder whether customer experience management should be included in CRM (Shukla & Pattnaik, 2019), while others argue that customer experience management, as a more dynamic concept, should replace CRM (e.g., Homburg et al., 2017). This may stem from the fact that academic research on customer experience management is still limited and only recently have there been efforts to differentiate this business model from other related ones, such as CRM (Hilton et al., 2020). However, there are differences between these two concepts. First, the goal of CRM is to manage customer relationships, interactions and data throughout the customer lifecycle. The use of CRM, understood as an operational tool, increases the efficiency of customer management processes, that is, the effectiveness of product or service sales and customer service. In turn, the strategic goal of customer experience management is to understand and meet customer needs by managing and optimising the holistic customer experience across all touchpoints (Verhoef et al., 2009). Examples include constant improvement of customer service and employee involvement (Clatworthy, 2019). Second, the scope of CRM covers tools for acquiring and managing customer databases (usually quantitative), sales processes, marketing campaigns and customer service. In contrast, the scope of customer experience management comprises a set of strategies and processes that go beyond technology, including qualitative data analysis based on, for example, customer journey mapping or observation of the customer's emotional ties with a company or brand. Third, CRM is associated with an internal orientation of a company, while customer experience management with a customer is associated with an external orientation. Fourth, as regards customer value, CRM puts more emphasis on value extraction, whereas the emphasis of customer experience management is on value creation (Lemon & Verhoef, 2016). Ultimately, companies use CRM and customer experience management to carry out separate but complementary activities associated

with the implementation of effective strategies, that is, those that can increase customer loyalty, accelerate business growth and optimise financial performance (e.g., Homburg et al., 2017; Klink et al., 2021; Wetzels et al., 2023).

Customer experience management is strongly linked to various areas of marketing research (e.g., Batat, 2020, 2024b; Becker & Jaakkola, 2020; Homburg et al., 2017; Lemon & Verhoef, 2016; Panina, 2022). In particular, customer experience theory, research and practice are a focal issue in a growing area of experience marketing (Ismail, 2011; Same & Larimo, 2012) or experiential marketing (Batat, 2020; Schmitt, 1999), which is a tactic and a narrower term than experience marketing. Experience marketing pertains to decisions related to the design, implementation and control of market activities of vendors, undertaken in accordance with the experience economy principles. Thus, it ultimately refers to products, services and e-services offered by enterprises (e.g., Dziewanowska & Kacprzak, 2019; Kacprzak & Hensel, 2023). For example, the belief that products and services should not only meet the functional needs of consumers but also provide them with unique, emotional and meaningful experiences is reflected in the model of experiential marketing developed by Batat (2020). The goal of this model is not only to improve the quality of customer experience but, at a tactical and operational level, to shift the focus from using traditional service marketing mix logic (7Ps) to a new experimental marketing mix technique (7Es) (Batat, 2020). The set of 7Es, that is, experience, exchange, extension, emphasis, empathy capital, emotional touchpoints and emic/etic process, can support companies using customer experience management already at the stage of designing customer experience.

HOLISTIC CUSTOMER EXPERIENCE MANAGEMENT: A CONCEPTUAL MODEL

Holistic customer experience management requires a combination of three perspectives: of the company; of the customer; and of experience co-creation (e.g., Agapito & Sigala, 2024; Lemon & Verhoef, 2016). The company can influence all elements of customer experience, and the consumer will either react or not to various stimuli generated by the company while co-creating the experience (Becker & Jaakkola, 2020; Gahler et al., 2023; Lemon & Verhoef, 2016; Klaus, 2018; Schmitt, 2003; see Figure 3.1).

Companies are looking for an opportunity to differentiate their products, services or brands in order to deliver positive customer experiences. What makes this possible is a comprehensively designed customer experience. The analysis and design of company-controlled stimuli is the first stage of holistic customer experience management. It involves goal definition, integration of activities related to defining customer experience, identification and measurement of its elements and gathering and analysing the right data. When

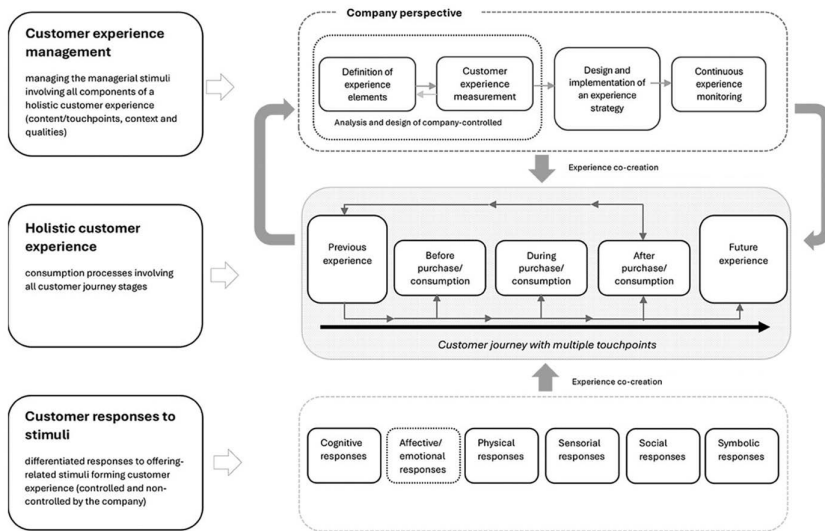


Figure 3.1 Proposal of a model for holistic customer experience management

identifying customer experience elements, special attention should be paid to touchpoint prioritisation (Lemon & Verhoef, 2016). The second stage of holistic customer experience management is strategy design and implementation. As stated by Schmitt (2003), the company's task in this area is to prepare the foundation for experience creation, which should include a multisensory and multidimensional representation of the desired experience and the values the customer can expect from the product or service. In other words, the customer should be presented with an offer in the form of experiential value proposition (Clatworthy, 2019). The third (and last) stage of holistic customer experience management refers to the monitoring of experience and company reactions to negative and neutral customer experiences. Moreover, monitoring is essential due to the fact that companies operate in a turbulent environment. This requires constant adaptation of customer experience management to uncertain conditions and control of company targets.

However, it needs to be noted that the customer experience management process described here is merely a simplification. As rightly pointed out by Jaakkola et al. (2022), companies are not able to directly create holistic customer experiences, or manage customer experiences per se. They can only 'create intended experiences for customers' (Jaakkola et al., 2022, p. 655). They can also monitor, measure and manage a range of stimuli that affect the experience (Becker & Jaakkola, 2020; Klaus, 2018). Thus, what is of key importance for customer experience management in experience-centric companies

is competences of personnel at all levels (e.g., Arkadan et al., 2024; Jaakkola et al., 2022). This necessitates incorporating another perspective in the customer experience management process, namely, the customer's perspective, with the associated customer responses to stimuli (controlled and non-controlled by the company), which independently shape customer experiences. These responses are described in the dimensions of customer experience (Gahler et al., 2023; Schmitt, 2003). Companies can consciously and responsibly refer to selected customer experience dimensions (Schmitt, 1999) and thus stimulate positive experiences. For instance, the purpose of customer experience management based on the cognitive dimension is to elicit deeper intellectual customer engagement and unconventional thinking about products, services, the company or the brand. This dimension is congruous with the other ones. The physical dimension is important for customer experience management in terms of matching products or services to the customer's bodily experience and lifestyle. The symbolic dimension also plays a role in customer experience management, as it describes how to use consumer expression during interactions with the company or brand. In turn, the sensory dimension of customer experience gives the company or brand an opportunity to stand out from the competition through the use of activities that affect the senses (sight, hearing, smell, taste, touch). What is important in this context is to be able to optimise the relationship between consumer perception and reality. Viewing the customer experience through the social dimension, on the other hand, helps build a community around the company or brand. This is important for customer experience management, as it gives companies an opportunity to increase their social relevance. Therefore, organisations should pay attention to the individual and/or collective experience that occurs during consumption (Clatworthy, 2019). Consequently, being customer-oriented allows the company to understand how customers evaluate their relationship with it during the entire journey, from the identification of needs to the post-purchase stage (Lemon & Verhoef, 2016). What is essential in these relationships is customer emotions (e.g., Atakan & Soscia, 2021), understood as key mediators and outcome variables for individual stages of customer experience and for past and future experience.

Shaw (2007) points out that customer emotions are important to companies, as they affect value in an organisation. Negative emotions may destroy this value and, consequently, contribute to terminating the customer–company relationship. The affective customer experience dimension allows the company to focus on analysing and designing the company-controlled stimuli. For this reason, in the first 'pre-experience' stage, the company can refer to the pre-purchase decision-making process. What is important here is positive customer emotions, evoking (positive) surprise, curiosity or even delight (e.g., Addis et al., 2018). It is worth considering the extent to which the emotions (their intensity and type) occurring in this stage will be important in a holistic

consumer experience. The second and third stages pertain to consumption and the experiences associated with them. In these stages, emotions are usually mixed (e.g., Gerhart & Oh, 2024). As already mentioned, a holistic customer experience consists of different elements, so the customer may feel a variety of emotions before, during and after the experience. The customer journey touchpoints, which the company can optimise, play a salient role here (Arkadan et al., 2024). It is important that companies who use customer experience management capture specific customer emotions in individual stages of customer experience, and take into account the ‘unique’ characteristics of consumers and the marketing context associated with specific channels of customer experience: offline; digital; and phygital (e.g., Batat, 2020, 2022a; Huang, 2001; Kosinski et al., 2013). Customer experience management also requires being oriented towards experience co-creation. Consequently, the company can explore the ways in which customer experiences are co-created by the customer, organisation and multiple other actors. This is why Holmlund et al. (2020) emphasised that customer experience management requires companies to use and integrate various databases, not only those available within the organisation but also those obtained from business partners, competitors and external touchpoints. The customer, on the other hand, proactively co-creates the experience by providing the company with feedback about products and services, and with opinions about their personalised experiences.

There are numerous conditions and trends that influence customer experience management (e.g., Heshmati et al., 2019; Köninger & Gouthier, 2024; Worlu et al., 2016). Of these, new technologies are given special importance. Currently, the key technologies having an effect on customer experience management are artificial intelligence, machine learning and deep learning. These allow the analysis of large datasets in real time to offer customers a unique customised offer, that is, hyperpersonalisation (e.g., Mróz, 2013, 2022; Singh & Kaunert, 2024). Other opportunities are provided by biometrics, which in combination with other technologies such as artificial intelligence and machine learning, can enable real-time personalisation based on recognised emotions (e.g., Godovykh, 2022; Kotler et al., 2023). Companies can also use chatbots or virtual assistants answering customer (user) questions. The quality of customer experience is also being improved with the use of the Internet of Things, persuasive technologies (e.g., mobile applications, wearables), virtual reality and augmented reality. The latter two are particularly beneficial for customers, who can, for example, visualise a product or participate in cultural events.

These examples can have an effect on the process of designing and managing a holistic customer experience. They are associated with numerous challenges for experience-centric companies, particularly in terms of ensuring the safety and security of customers' personal data. Thus, companies that use, for example, automation processes have to address the challenge of a growing number of inauthentic and bot-like behaviours (Sykora et al., 2022).

PART II

The complex nature of emotions in customer
experience research

Introduction to Part II

Since the introduction of the term ‘experience’ by Abbott (1955), customer experience research has consistently developed (see Becker & Jaakkola, 2020; Kranzbühler et al., 2018). The understanding of customer experience requires a combination of knowledge from various disciplines, including marketing, customer behaviour and psychology. This is particularly important given the lack of a single, common definition of a holistic customer experience that would integrate various perspectives and its nomological network (Becker & Jaakkola, 2020). Research on this issue requires examining and capturing multisensory and emotional aspects of experiences stemming from product or service consumption, causing methodological problems related to their conceptualisation and operationalisation. The concentration on the way in which products connect with customers, common in previous studies (Pine & Gilmore, 1998), is being increasingly often replaced by neuromarketing or sensory-branding analyses, focusing on stimuli that allow for creating sensory experiences (Kranzbühler et al., 2018).

Irrespective of the analytical perspective adopted by researchers, one of the main components of consumption experience is emotions (Hirschman & Holbrook, 1982). They are important in the context of analysing both specific customer–product touchpoints and the sequence of events related to the process of product purchase and consumption. Considering the emotional component as a key element of customer experience, there is a need to capture emotions in three stages: pre-, during and post-purchase/post-consumption. The overarching theme of Part II is the general issue of emotions and their measurement in customer experience research. It is a demanding task due to the complex nature and heterogeneity of emotions, which poses challenges related to their measurement.

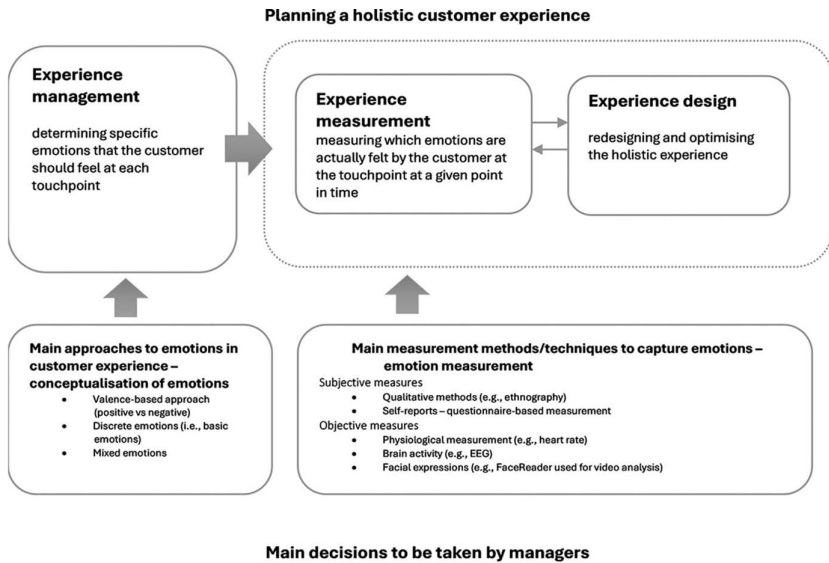
Thus, Part II aims to systematise approaches, methods and techniques for measuring emotions in customer experience research. It advances the traditional self-report and retrospective (ex-post) questionnaire-based approach, presenting the possibilities for measuring physiological and neural responses of the body, enabling a continuous measurement of emotions. This may allow for capturing various emotional components of a holistic customer experience. To achieve this goal, it is necessary to develop new methodologies that would

transcend the limitations of the existing methods for measuring consumer emotions. The measurement of mixed emotional states in customer experience research poses a dilemma for researchers and practitioners, stemming from the complexity of customer experiences and emotions. Furthermore, it requires a conscious integration of methods for measuring emotions in customer experience research, taking account of the study objectives and the specific character of the service environment, industry or a particular group of consumers (e.g., young versus older people), whose experiences are being analysed.

4. Emotions in customer experience research: from valence to mixed emotions

There is no doubt that emotions are a core component of customer experience (Bastiaansen et al., 2019; Kuuru et al., 2020; Rais et al., 2016; Tumbat, 2011). To create a holistic customer experience it is essential to understand the role of emotions in this experience. However, as stated by Kuuru et al. (2020), the association between emotions and customer experience remains largely unexplored. In their attempts to provide customers with satisfactory experiences, managers usually focus on positive emotions, at the same time striving to reduce the negative ones as part of experience management (Wang et al., 2021). The experience management strategy should include several steps (Bastiaansen et al., 2019). First, the determination of specific emotions that the customer should experience at every touchpoint (Bastiaansen et al., 2019). Second, the measurement of emotions experienced in particular stages of the customer journey. Third, the introduction of any changes to the initial experience design, based on the measurement from the previous step, which allows for optimisation. The design of a satisfactory holistic experience often requires several iterations related to the measurement and the introduction of changes (Bastiaansen et al., 2019). At each of the stages, it is necessary to adopt a relevant approach to the conceptualisation of emotions, which determines their measurement (Figure 4.1).

Emotions are one of the key aspects of human experience. They also play a salient role in the social life and behaviour of individuals (Carlson & Wang, 2007). Every day, people experience many different emotions in response to events related to their personal lives and the market offer. Thus, in recent years, emotions have attracted increased attention from researchers, becoming a growing area of research (Sharma et al., 2023). Emotions are the subject of interest not only for psychologists, but also representatives of many other disciplines, including marketing and consumer behaviour researchers (Babin et al., 1998; Bagozzi et al., 1999; Gaur et al., 2014; Poels & Dewitte, 2006; Richins, 1997). The role of emotions in this area has been extensively analysed, with studies focusing on various contexts, including advertising (Hadinejad et al., 2019a), electronic word-of-mouth communication (Budzanowska-Drzewiecka,



Source: Based on Bastiaansen et al. (2019).

Figure 4.1 Emotions in planning a holistic customer experience

2023; Lelieveld & Hendriks, 2021; Robertson et al., 2021; Sykora et al., 2022; Torabi et al., 2021) and services (Hsieh & Yuan, 2021; Tumbat, 2011). One of the areas in which emotions play a prominent role is consumer experience (Manthiou et al., 2020; Richins, 1997).

Despite the development of research on emotions in marketing and consumer behaviour (e.g., Huang, 2001; Kuuru et al., 2020; Märtin et al., 2023; Soscia, 2013), their role has not been fully explained. This stems from their abstract and subjective character, which makes them difficult to study and understand (Guo et al., 2024). Furthermore, as emotions are always experienced in a subjective manner, different people can display different emotional reactions to the same event experienced in the same circumstances (Kuuru et al., 2020). These emotions are expressed at three levels (Bastiaansen et al., 2019), namely, the subjective experience is additionally accompanied by physiological processes and specific expressive behaviour (e.g., facial expressions or gestures).

Moreover, the multidisciplinary of the research on emotions has contributed to a non-systematic use of emotion terminology (e.g., emotions, affects and feelings) in business-oriented literature (Kuuru et al., 2020). Therefore, any discussion about the role of emotions in customer experience research necessitates characterising emotions that are consciously experienced by consumers

and differentiating them from other states, such as moods or affects. Mood is often understood as an emotional state that is not explicitly linked to an event or stimuli. Moods are usually long-lasting, low-key and steady. In turn, affect is an automatic reaction, usually triggered by strong external stimuli, especially abrupt, that recognises that something is good or bad (Wang et al., 2021). Affects have a clear physiological component and limit rational action.

CONCEPTUALISATION OF EMOTIONS IN CUSTOMER EXPERIENCE RESEARCH

Researchers have long been intrigued by the nature of emotions. There is no consensus in the literature on a definition of emotions. They have a colloquial meaning (everyday concept, descriptive definition) but, at the same time, are a scientific term (prescriptive definition) (Widen & Russell, 2010). There have been many attempts to define emotions in emotion research. Nevertheless, researchers have problems in providing an unambiguous and consistent definition of what emotions really are (Izard, 2010; Panksepp, 2012; Plutchik, 1982). For example, Fantino (1973) compiled a broadly selected list of 11 definitions, whereas Plutchik (1980) listed 28 (Kleinginna & Kleinginna, 1981). In the 1980s, researchers created a list of 92 definitions and nine sceptical statements pertaining to emotions (Kleinginna & Kleinginna, 1981), which were then grouped into 11 categories: affective (phenomenal); cognitive; external emotional stimuli; physiological; emotional/expressive behaviour; disruptive; adaptive; multi-aspect; restrictive; motivational; and sceptical or disparaging statements about the utility and status of the word 'emotion' in science (Izard, 2010; Kleinginna & Kleinginna, 1981). Researchers differ not only in their approach to defining emotions, but also in emotion differentiation.

Emotions can be defined as a complex reaction arising from appraisals of self-relevant interactions with the environment (Lazarus, 1991). More specifically, emotions are valenced affective reactions to perceptions of situations (Ortony et al., 2022; Richins, 1997). Emotions can be understood as affective states representing evaluative reactions towards events, factors or objects (Craciun et al., 2020, p. 2). Emotion is a psychological state associated with an event (occurring in the external world, and sometimes in the mind), which, as stated by Frijda (1986), is meaningful, triggers specific reactions and motivates action (see also Ellsworth & Scherer, 2023). An emotion is not synonymous with a passive feeling, especially since a feeling is considered one of the components of emotions, referring to the subjective experience of an emotional state once it has occurred.

Emotions are an important predictor explaining the interaction between an individual and an external situation (Kujur & Singh, 2018; Wang et al., 2018). They are both intra- and interpersonal. In the former case, they pertain to the internal experiences of an individual. The interpersonal dimension, in turn,

describes the external expression of emotions during communication with others (Wang et al., 2019). Both these approaches are important for customer experience analysis. The first one allows for understanding customer preferences with regard to the offer, whereas the second one encourages customers to share their experience related to the consumption of goods and services.

Emotions have specific characteristics, such as valence, intensity and content. Valence refers to the positive or negative tone of emotions. Intensity describes the strength of their impact on an individual's behaviour. Finally, content determines the meaning of a stimulus, leading to a specific behaviour (e.g., anger leads to aggressive behaviour). Consequently, research on customer emotions may focus on one of these characteristics (e.g., valence in a valence-based approach) or a combination of characteristics (e.g., focusing on the complexity of emotions in customer experience). This requires making a decision as to how emotions are understood and how they will be operationalised (e.g., what categories of emotions will be included in the study).

Although researchers are interested in emotions, they often employ psychology knowledge to determine the role of emotions in the context of marketing and consumer behaviour, rather than developing their own marketing-specific concepts and categorisations of emotions. Psychological literature offers three main theoretical approaches describing emotions: dimensional (valence and arousal-based); categorical/modular (i.e., related to discrete emotions); and cognitive appraisals (referring to the cognitive process involving emotion elicitation) (Caruelle et al., 2024; Ekman, 2016; Kujur & Singh, 2018). However, according to Huang (2001) and Gaur et al. (2014), customer emotion researchers are not making the most of the specific characteristics of emotions stemming from psychological concepts. Huang (2001) claims that differences between concepts of emotions in psychology and marketing pertain to a range of emotions, intensity of emotions and valence (positive versus negative emotions). In marketing studies, the range of emotions is associated with a specific marketing context in which emotions are being evoked. The way of capturing emotions, in relation to the context or not, determines their categorisation.

Marketing contexts are usually associated with specific emotions, usually positive ones. In turn, treating emotions as traits of consumers, and of individuals in a broader perspective, allows for capturing them without any contextual reference, which offers an opportunity to study a complete categorisation. Naturally, when designing an experience-generating product or service, it is important to remember the wide range of emotions consumers might potentially experience. Especially since, as Sharma et al. (2023) emphasised in their review of the consumer emotions literature, to understand the role of emotions in consumption experience, it is recommended to study various emotions. However, the marketing context fosters the measurement of individual emotions rather than their diversity.

Another overall difference in the concepts of emotions in psychology and marketing pertains to the intensity of emotions experienced by consumers. Emotions felt by consumers following their contact with the market offer are often of lower intensity as compared to emotions associated with interpersonal relations (Richins, 1997). Furthermore, this lower intensity stems from the fact that these emotions are more of a mix of two or more primary emotions, rather than emotions consistent with the categories defined in the major psychological theories (e.g., Izard, 1977; Plutchik, 1980). Marketing and consumer behaviour studies that include a narrower range of emotions tend to focus on the dimensional (valence-based) conceptualisation of emotions (Hosany et al., 2021). However, focusing solely on emotional valence (positive versus negative emotions) oversimplifies the complexity of an emotional experience and may lead to omitting various emotions of similar valence (Hosany et al., 2021). Furthermore, Huang (2001) indicates that research on emotions in marketing has often treated positive and negative emotions as two opposite poles. Yet, the occurrence of positive emotions does not preclude the presence of the negative ones in connection with the market offer. Therefore, the bipolar approach towards valence has been replaced with a proposition of two unipolar affective dimensions, that is, positive and negative emotions, constituting two separate emotional dimensions. This allows for capturing the ambivalence of emotions, and thus identifying co-occurring positive and negative emotions. Consequently, it is possible to focus on mixed emotions (also referred to as 'emodiversity' (Wang et al., 2021) or complex emotions (Berrios, 2019), which describe emotional states encompassing various positive and negative emotions occurring at the same time (e.g., Gerhart & Oh, 2024; Oh & Tong, 2022)).

Focusing on mixed emotions in marketing and consumer behaviour research, or more specifically in customer experience research, requires going beyond the strict valence-based approach, and considering the mix of co-occurring discrete emotions, each of them having its own, specific character. Capturing discrete emotions is characteristic of the categorical approach to the conceptualisation of emotions. Discrete emotions are a set of idiosyncratic affective states, which allows for analysing the behavioural consequences of specific emotions (Hosany et al., 2021). Discrete emotions (qualitatively separate) are affective states, which have the ability to evoke or reinforce specific behaviours associated with them (e.g., anger – aggression) (Wojciszke & Baryła, 2004, p. 31). Experiencing them is usually accessible in the form of a conscious assessment of one's affective state (e.g., I'm happy, I'm angry) (Wojciszke & Baryła, 2004). There is not a complete consensus among researchers as to the number of discrete emotions (Jarymowicz & Imbir, 2010). Turner and Ortony (1992) emphasise that there is also a discussion about which of these emotions should be considered basic and what basic emotions actually are. The literature describes different theoretical models of basic emotions (Tracy & Randles,

2011) based on various other approaches towards understanding emotions (e.g., Ekman focused on facial expressions, Izard on biosocial considerations and Panksepp on the brain) (Turner & Ortony, 1992). These approaches might serve as the basis for explaining the differences in the sets of basic emotions.

Basic emotions, that is, universal emotions experienced irrespective of one's culture, have been of great interest to many researchers. One of the seminal works on this subject has been developed by Ekman. He focused on six basic emotions associated with facial expressions, namely, happiness, sadness, anger, fear, disgust and surprise (Ekman & Cordaro, 2011; Ekman & Friesen, 1969). The list has been extended with one more basic emotion – contempt. Ekman not only differentiated between basic emotions (Ekman, 1971; Ekman & Friesen, 1969, 1971), but also proposed descriptions of how to analyse facial movements (Facial Action Coding System) to measure the seven emotions (Matsumoto & Ekman, 2004). Initially, he studied samples of people from different parts of the world, showing them pictures of faces expressing various emotions. He established that irrespective of their culture, people recognised emotions in a similar way and that these emotions had a universal rather than a cultural character. Izard reached similar conclusions. However, his studies (Izard, 1977) focused mainly on literate cultures (Matsumoto & Ekman, 2004). Izard (1977) identified ten primary and discrete emotions: fear, anger, shame, contempt, disgust, guilt, distress, interest, surprise and joy. His approach has been used in marketing research (Machleit & Eroglu, 2000).

Plutchik (1980) extended Ekman's list of six basic emotions, adding two more: trust and anticipation, excluding shame and guilt proposed by Izard. He created the wheel of emotions containing eight primary emotions and their combinations. These include joy, anticipation, surprise and trust, classified as positive emotions, and anger, fear, disgust and sadness, classified as negative emotions. This approach shows the relationships between emotions, their intensity and opposites. The intensity of emotions is the highest in the centre of the wheel and decreases towards its outer circles. Furthermore, the wheel of emotions shows how emotions can blend to form complex (secondary) emotions. These occur as dyads, that is, combinations of two primary emotions. The model groups emotions into four dyads: surprise versus anticipation; trust (liking) versus disgust; fear versus anger (irritation); and sadness versus joy.

These are not the only categorisations of basic emotions. For instance, Panksepp has contributed substantially to our understanding of the neurobiology of emotions (Turner & Ortony, 1992). He described seven major emotional systems, found not only in humans, but also in other mammals, that is, seeking, rage, fear, lust, care, panic/grief and play (Panksepp, 1998, 2012). Each of these systems is organised in a separate region of the brain and, under specific conditions, can become the dominant principle for the functioning of the mind.

Numerous researchers have questioned the criteria for distinguishing basic emotions as well as their lists (Ekman, 2016; Sabini & Silver, 2005; Tracy & Randles, 2011; Turner & Ortony, 1992). It also needs to be mentioned that basic emotions play a key role in early human development. As a result of learning, they are eventually transformed into more complex emotional states, regularly experienced by adults (Tracy & Randles, 2011). Furthermore, the categorical approach to emotions does not determine the emotional causes (Hosany et al., 2021). An approach that addresses earlier approaches' limitations to the conceptualisation of emotions and offers a unifying approach to studying consumer emotions and explaining their role is the cognitive appraisal approach (Moors et al., 2013). This theoretical approach to emotions was pioneered by Arnold (1960) and Lazarus (1966). The main assumption of appraisal theories is that emotions are adaptive responses which reflect the assessment of environmental features relevant for one's well-being (Moors et al., 2013). This allows for defining emotions as a process rather than a state. Consequently, the term 'emotion' is often used in the sense of an emotional episode. Theories within this approach have a componential character. This means that an emotional episode triggers changes in the organismic sub-systems or components.

Research on customer emotions usually employs the categorical and dimensional approaches, despite their limitations. According to Hosany et al. (2021), this is justified by the objective of a given study. The dimensional approach is a good choice when researchers attempt to determine the emotional tone (positive versus negative), rather than the specific emotions that people experience. On the other hand, if the aim of the study is to identify a specific emotion or set of emotions experienced by study participants, irrespective of valence, it is necessary to use the categorical approach. In turn, if the study investigates the antecedents of specific emotions, it is recommended to use the cognitive appraisal approach. Importantly, Wang et al. (2021) claim that customer experience research has mainly focused on valence (valence-based approach) and specific discrete emotions, ignoring the diversity of emotions (i.e., emodiversity, mixed emotions). The emodiversity-based approach aims to capture the complexity of emotions in customer experience. In other words, this type of research focuses on the number and relative abundance of different emotions that customers experience during the consumption of goods and services (Quoidbach et al., 2014; Wang et al., 2021).

APPROACHES TO EMOTIONS IN CUSTOMER EXPERIENCE RESEARCH

The development of research on the role of emotions in customer experience is apparent in numerous areas. It mainly pertains to advances in the methods of measuring and capturing emotions (Khare et al., 2024; Verhulst et al., 2020). However, these methods have to constantly develop due to changes in defining

the subject of research. In other words, there are changes in the way research provides answers to the following questions: ‘What emotions are being studied?’ (i.e., conceptualisation and operationalisation of emotions) and ‘What is the context in which emotions in customer experience are being studied?’ (i.e., what is the subject of analyses: goods or services; in what kind of environment).

According to one of the attempts to systematise the various phases of consumer emotions literature proposed by Sharma et al. (2023), studies evolved from focusing on human emotions (prior to 1980), through enhancing consumer engagement (2010–2015) to analysing digitisation of consumer experience (present). In the case of the last two phases, a prominent place is held by consumer experience/consumption experience research. As regards customer experience research, this evolution is reflected in the transition from the focus on valence, through the exploration of specific discrete emotions to investigations into mixed emotions (Wang et al., 2021).

Thus far, only a few studies have explicitly linked customer experiences and emotions (Kuuru et al., 2020). Some of them attempted to develop scales or techniques for measuring emotions in customer service experiences (e.g., Jüttner et al., 2013; Kautish et al., 2021), whereas others investigated emotions in customer experience in specific contexts. Analysing emotions in various aspects of consumption behaviour is typical of customer experience research described in the literature. This stems from the fact that ‘customer experience’ is an umbrella term for diverse experiences (Kuppelwieser & Klaus, 2021; Kuuru et al., 2020), for instance, user experiences (Isomursu et al., 2007), tourist experiences (Tuerlan et al., 2021) or patient experiences (e.g., Altinay et al., 2023; Godovykh & Pizam, 2023; Klaus, 2018; Pinna et al., 2018). Undoubtedly, emotions play a salient role in studies of service experiences, which allows for extending our knowledge in various areas, for example, hedonic services (Bigné et al., 2008), service environments (Lin & Liang, 2011) and service quality (Guo et al., 2024).

When in contact with a service, especially in the case of high-contact services, emotions are an important factor affecting consumer perception and assessment of the experience (Guo et al., 2024). Emotions experienced by customers during the consumption of services provide clues on how they assess their quality (e.g., Alnawas & Hemsley-Brown, 2018). This stems from the fact that in the course of an experience (during consumption), the customer experiences a higher level of emotional arousal (Caruelle et al., 2024). Therefore, understanding the role of emotions in customer experience is important not only for the individuals directly involved in service consumption/provision, that is, consumers and employees, but also for organisations (Delcourt, 2024). Furthermore, service environments play an important role in service delivery (Lin & Liang, 2011), as environments can foster various emotional responses. Their role is prominent in both offline and online settings (Chu, 2022; Märtin

et al., 2023); and even in virtual reality (Magalhães et al., 2024). It should be stressed that despite the development of digital and virtual services, the physical context still has a significant impact on customer experience (Klaus, 2023). Importantly, customer experience is in itself a specific context for analyses, which necessitates treating it as a holistic construct (Lemon & Verhoef, 2016). However, it needs to be emphasised that there is no consensus in the literature to treat customer experience as specific to a particular consumption context (e.g., across different service types). Consequently, no consensus has been achieved with regard to emotions' role in customer experience research. On the one hand, Roy (2018) demonstrated that customer experience may differ depending on, for example, the service type (hedonic versus utilitarian) and customer type (regular versus new customers). On the other hand, there is a need to synthesise fragmented findings and seek universal tools enabling emotion measurement in consumer experience – all the more so since a holistic approach towards customer experience poses a challenge to studies that are usually embedded in a specific context (Klaus, 2023; Kuppelwieser & Klaus, 2021).

Kuuru et al. (2020) proposed a framework presenting the role of emotions in customer experience, comprising eight categories (emotion types) combining emotions with customer experience. Type 1 pertains to managing emotions which emerge during direct personal or online interactions between the customer and the organisation or its representative. In other words, it relates to employee competences which allow for managing customer emotions during various processes (e.g., customer service). Nevertheless, it needs to be remembered that emotions are not fully predictable (Verma & Tiwary, 2014), which may hinder their management. Therefore, companies use various emotional stimuli or cues, which have been categorised as Type 2 and are associated with indirect interactions that allow for managing customer emotions. Type 3 focuses on the emotional responses of customers to various cues or components of customer experience. These include customers' reactions to an odour, specific elements in the customer service process, etc. Type 4 concentrates on how customers assess the experience in terms of emotions, which allows for analysing the emotional dimension of the entire customer experience. Type 5 pertains to the emotional aspects observed in various stages of the purchasing process (decision making). Here, positive and negative emotions occur as a consequence of going through the entire process, for example, when interacting with information (reliable or misleading), which is relevant at the stage of information seeking, or with assortment, which is relevant when assessing the market offer. In Type 6, emotions are regarded as drivers of experience outcomes (e.g., loyalty or electronic word of mouth). Type 7 focuses on the emotional links and bonds between the customer and the brand or technology,

which develop during interactions between the customer and the organisation. Finally, Type 8 pertains to various specific emotions per se that are experienced during the customer journey.

To advance our understanding of emotions' role in customer experience research, Manthiou et al. (2020) developed five propositions. First, customer experience research should assume that positive and negative emotions can co-occur during a holistic customer experience. Thus, customer experience research should take account of the diversity of emotions, focusing on basic emotions at the very least. Second, the experience of positive emotions does not automatically lead to a positive customer experience. Likewise, negative emotions do not necessarily have to generate negative experiences only. Third, since employees often play an important role in the process of service delivery, positive or negative emotions towards an employee do not have to automatically affect the way the customer perceives the company's image or the experience as a whole. Fourth, customers are not passive in experiencing emotions, with no possibility of controlling their emotional experiences. Fifth, consumption-related emotions are not purely interpersonal, as the social context is important and can affect an emotional experience (Manthiou et al., 2020).

5. Approaches to measuring emotions in customer experience research

Without a doubt, measuring emotions to understand consumer reactions to various aspects of the market offer is of great importance to businesses. Both practitioners who design and manage customer experience and customer experience researchers are interested in understanding and measuring customer emotions. All the more so since, as emphasised by Bastiaansen et al. (2019), customer experiences are memorable when they evoke emotions. To analyse this aspect of customer experience it is essential to recognise and measure affective reactions of consumers when interacting with the market offer.

Investigating the role of emotions in customer experience is a fascinating, complex and challenging research task. Interest in the methods for measuring customer emotions has increased in the last decade (Danner & Duerschmid, 2018; Li et al., 2015; Petermans et al., 2009; Poels & Dewitte, 2006). However, emotion recognition and measurement remains a difficult challenge facing customer experience researchers. Despite their efforts, emotion researchers have not yet developed a single objective measure that would conclusively determine what emotions are felt by customers in a holistic customer experience. There are numerous methods that can be used for identifying and measuring emotions in customer experience research (see Manthiou et al., 2020; Petermans et al., 2009; Verhulst et al., 2020). The available research methods and approaches do not allow to fully capture the complexity of this issue, making emotion measurement and analysis a difficult task (Volo, 2021).

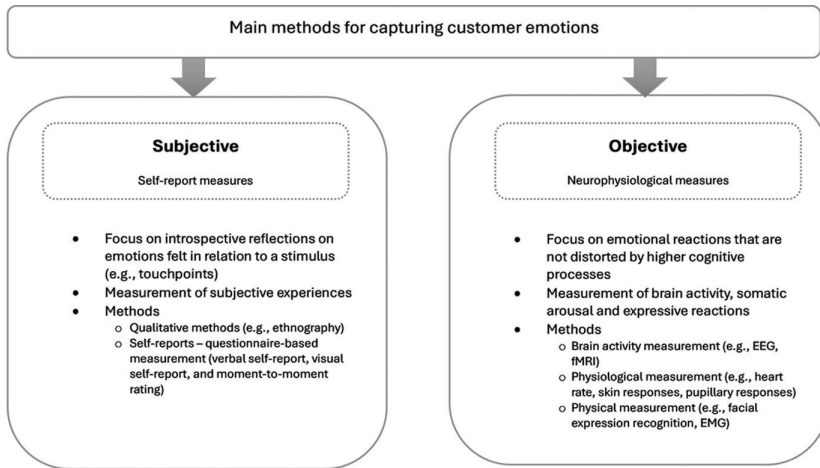
The challenges faced by researchers who analyse emotions in consumption experience stem from both the nature of emotions themselves and the complexity of customer experiences. First, these difficulties are associated with the need to unambiguously define emotions before the study design stage. However, despite numerous attempts to conclusively define emotions, researchers came up with various definitions focusing on different emotional manifestations or components. It is a sort of consensus to treat emotions as multifaceted phenomena encompassing subjective sensation, somatic arousal (e.g., physiological reactions such as a faster heart rate) and expressive reactions/behaviours (e.g., facial expressions such as a smile) (Mauss & Robinson, 2009). Consequently, research methods often focus on one of these elements,

ignoring the others, which leads to a wide variety of approaches to measuring emotions in customer experience research. Moreover, when measuring emotions, it is necessary to consider differences between them, especially in cases where they require a different type of processing: automatic (i.e., lower-order emotions) versus cognitive (i.e., higher-order emotions) (Poels & Dewitte, 2006). Higher-order emotions are more complex than lower-order emotions and need deepened cognitive processing. They must be consciously identified as a specific emotion. Poels and Dewitte (2006) placed basic emotions between thus defined lower- and higher-order emotions, since basic emotions can be experienced either automatically or after cognitive appraisal. Furthermore, difficulties in analysing emotions in customer experience are associated with the range of emotions measured (valence-based versus mixed-method approach) and the ability of customers to recall mixed emotions experienced in the past (Aaker et al., 2008).

Second, this differentiation is further complicated by ambiguities related to the approach used in measuring customer experience per se. The measurement of a holistic customer experience (before, during and after consumption) is a source of problems for researchers. The traditional experience measurement methods have not been able to fully capture and examine the emotional states of consumers before, during and after purchase (see Godovykh & Tasci, 2020). Furthermore, customer experience research employs two main approaches: static and dynamic (Kranzbühler et al., 2018). The first concentrates on experiences at specific touchpoints at one point in time. The other analyses holistic customer experiences over time (before, during and after consumption).

In light of these considerations, it is essential to develop methods of identifying and measuring emotions in customer experience research that would allow for both capturing emotions at individual touchpoints and analysing them holistically. This task requires the use of various methodological approaches encompassing different qualitative and quantitative methods (Bastiaansen et al., 2019; Li et al., 2015). Current methods for measuring emotions in customer experience can be grouped into two general categories: subjective (self-report, verbal, implicit) and objective (autonomic, non-verbal, explicit) measures (Li et al., 2015; Poels & Dewitte, 2006; Verhulst et al., 2020; see Figure 5.1). This categorisation can be successfully used in customer emotion research, not only in customer experience studies but also when attempting to capture customer emotions in response to advertisements (Poels & Dewitte, 2006) or when conducting context-specific studies (e.g., experiences in tourism services (Li et al., 2015; Santos et al., 2022), hotel services (Tuerlan et al., 2021; Wu & Gao, 2019) and hospital services (Altınay et al., 2023; Song & Qu, 2017)).

Each of these groups of methods allows for capturing and measuring a different component of emotions. Hence, they complement each other. For example, the subjective component of emotions can only be measured through



Source: Based on Alsharif et al. (2021), Cherubino et al. (2019), Desmet (2018), Godovykh and Tasci (2020), Khare et al. (2024) and Poels and Dewitte (2006).

Figure 5.1 Methods for measuring emotions in customer experience research

self-report measures (Desmet, 2018; Hertel & Hertel, 1999), which, in turn, are not able to capture the physiological reactions accompanying the emotions experienced. The fact that emotions trigger both psychological and physiological reactions enables the use of solutions that go beyond declarative measurement (Danner & Duerrschmid, 2018). Consequently, emotion measurement can be performed with various techniques that record bodily responses. This can be done using neurophysiological measures. Therefore, it is worth considering a combination of different methods in customer experience research.

SUBJECTIVE MEASURES OF EMOTIONS IN CUSTOMER EXPERIENCE RESEARCH

The interest in measuring consumer emotions in various disciplines, including customer experience research, fosters the development of various methodological approaches available to researchers. Although there are numerous ways to measure emotions, including consumer emotions, this area of research is constantly changing, creating a need for new solutions. This stems from the complexity of emotions themselves. Sources of data about emotions in emotion research include behaviours, physiological states or consumer neuroscience measurements. However, knowledge about customer emotions is still mainly derived from the 'language' and self-report measures (Hertel & Hertel, 1999;

Ortony et al., 2022), enabling the measurement of the subjective component of emotions (Desmet, 2018). This approach to measuring emotions is based on the ability of the subjects to report introspective reflections about emotions triggered by specific stimuli. In the case of customer emotion research, these stimuli are associated with the market offer, such as advertising (Poels & Dewitte, 2006), products, such as foods (Jaeger et al., 2018; Meiselman, 2021), or touchpoints in the customer journey (Rais et al., 2016).

Subjective measures of customer emotions include various methods allowing for different measurements of customer data. For example, customer experience research makes use of ethnography (Tumbat, 2011). As a result, it has been established that emotion management by service providers and customers is important in service experience. It has transpired that in some cases all the participants form an integral part of the service experience, since they are its co-creators. Other studies have used an experience-based sampling method (i.e., a multi-entry diary approach), which enabled an in situ measurement of customer experience (Liu et al., 2016). Regardless of other possibilities, the subjective component of emotions is predominantly measured using self-report methods. These can have both a qualitative (e.g., in-depth interviews) and quantitative (e.g., questionnaire-based approaches) character. What distinguishes this group of methods is the fact that respondents are asked to express their emotional reactions by answering open questions or assessing their emotional states using scales (Li et al., 2015). This way of measuring emotional responses is usually retrospective (Verhulst et al., 2020). This means that the respondent is subjected to a stimulus (e.g., display of an advertisement or interaction with a product) and the measurement is performed afterwards. Researchers have proposed different self-report methods for collecting emotional responses (Desmet, 2018; Isomursu et al., 2007). Although these methods were initially developed to measure customer emotional reactions to different marketing stimuli, especially to advertising (Poels & Dewitte, 2006), they can be successfully adapted to measuring emotions in customer experience research. However, due to their specific features, the methods differ in their usefulness in various research setups (Isomursu et al., 2007). Not all of them are equally fit for use in customer experience research.

Generally, this category of customer emotion measures includes verbal self-report methods, visual self-report methods and moment-to-moment rating (Poels & Dewitte, 2006; see Table 5.1).

The first category comprises *verbal self-report methods*. This group includes specific qualitative and/or quantitative techniques. In other words, they require respondents to report the experienced emotions in two different ways. Qualitative interview-based empirical research employs predetermined sets of open questions. In turn, the quantitative approach is based on sets of rating scales (e.g., items using Likert scales; Li et al., 2015) or verbal protocols (Desmet, 2018). Usually, these are emotion lexicons (emotion adjectives),

Table 5.1 Self-report methods for collecting customer emotional responses

Criterion	Verbal self-report methods	Visual self-report methods (non-verbal methods)	Moment-to-moment rating
Temporal capture of self-reports	Retrospective (<i>ex post</i>)	Retrospective (<i>ex post</i>)	Real-time measurement
Stimulus formats	Verbal/text reporting on emotions Experience based on scales or open-ended questions (e.g., emotion word questionnaires)	Cartoon-like figures, such as pictograms or emojis, representing different emotions or emotional states (e.g., emoji questionnaires)	Direct contact with a stimulus (e.g., during an experience, advertising)
Research approach	Qualitative and/or quantitative	Rather quantitative	Rather quantitative
Type of emotions measured	Any sets of discrete emotions or their combinations	Limitations stemming from emotions included in available tools	Dimensional approach, measurement in a single dimension only (e.g., happiness)
Application in cross-culture research	Difficult to apply	Easy to apply	Rather difficult to apply
Application in customer experience research	Easy to apply	Easy to apply	Rather difficult to apply

with rating scales in the form of semantic differentials or Likert scales (Poels & Dewitte, 2006). Self-report scales may be derived from various theoretical frameworks. Thus, they are based on both dimensional approaches (e.g., valenced-based or the pleasure–arousal–dominance (PAD) model) as well as categorial approaches (e.g., capturing basic emotions). These methods, especially the quantitative ones used in questionnaire-based research, owe their popularity to the fact that they usually do not require any specialist equipment or software. Therefore, their application is relatively easy and affordable. Furthermore, the use of previously validated scales allows for result comparability, which is particularly important when designing research studies. The major advantage of verbal self-report methods used in customer emotion measurement is their flexibility. These scales, used to capture subjective consumer

experiences, can represent any set of specific emotions or their combinations (Desmet, 2018). However, these methods have some disadvantages, too. First, they represent the retrospective character of measurement. Respondents are asked to evaluate their affective states that occurred in the past, which is the case even if the study takes place immediately upon contact with the stimulus, rather than to provide a real-time evaluation. This means that the methods do not allow for determining which stimulus triggered specific emotions, which emotions were experienced most intensely or at which point they changed. Second, they can be tiresome, as they commonly consist of a long list of emotion adjectives (Poels & Dewitte, 2006) and, importantly, they may cause difficulties in verbalising emotions experienced by consumers (Isomursu et al., 2007). Third, word-based questionnaires employ emotion lexicons, which require reading and writing skills and appropriate interpretation. This, in turn, may be a limitation when studying certain respondent categories (e.g., the elderly or persons with disabilities). Fourth, they are difficult to apply in cross-cultural research (Desmet, 2018). This is largely related to language specificity and problems with linguistic equivalence. Thus, translation of scales is problematic and often requires a procedure enabling a full adaptation of a given instrument to a specific cultural context.

The second category of self-report methods includes *visual self-reports* (non-verbal methods). These are based on pictograms which are used by responders to describe their emotions. The underlying assumption of these methods is the conviction about the universal character of emotions and the ability of people from different countries to identify them based on facial expressions. Their major advantage is that they take account of non-verbal signals, as their lack results in misinterpretation of emotions. Thus, measurement methods relying on non-verbal cues may offer ecological validity in customer emotion research (Jaeger et al., 2018, 2021).

There are several instruments that serve this purpose (see Desmet, 2018). These include the Self-Assessment Manikin (Lang, 1980), measuring generalised emotional states, and the EmoCards or Product Emotion Measuring instrument (PrEmo®) (Desmet, 2018), capturing distinct emotions. These instruments have been successfully used for measuring customer emotions in response to products (Desmet, 2018) and advertisements (Morris, 1995; Poels & Dewitte, 2006).

The first technique, the Self-Assessment Manikin, employs a non-verbal pictorial evaluation approach based on the dimensional approach to emotions (Khare et al., 2024; Morris, 1995). It relies on the three PAD dimensions described by Mehrabian and Russell (1977). It is a simple and effective technique for measuring customer emotions in three dimensions: pleasure, arousal and dominance (Bradley & Lang, 1994). Based on a series of figures, it allows for determining respondents' affective reaction to stimuli along a continuous

scale in each of the three dimensions: pleasure–displeasure; degree of arousal; and dominance–submissiveness (Morris, 1995). During the measurement, respondents select a picture which, in their opinion, best represents the emotions they feel in each of the three independent and bipolar dimensions in response to a stimulus (e.g., advertising, product). Despite its simplicity, this technique has some limitations. It can measure only generalised emotional states in three dimensions, not individual emotions. A set of 14 emotions can be measured with PrEmo® (Desmet, 2018). In this technique, each of the emotions is illustrated with an expressive cartoon animation (i.e., animated cartoon character with dynamic facial, bodily and vocal expressions). Among these 14 emotions, seven are unpleasant (i.e., indignation, contempt, disgust, unpleasant surprise, dissatisfaction, disappointment and boredom) and seven are pleasant (i.e., desire, pleasant surprise, inspiration, amusement, admiration, satisfaction and fascination). During the measurement, respondents are asked to select an animation that corresponds with emotions they are experiencing, which allows for registering several emotions experienced at the same time. Thus, the tool can be used to measure mixed emotions. PrEmo® has been successfully used to measure non-verbal subjective emotional responses to various products (e.g., food (Gutjar et al., 2015) and cars (Desmet & Dijkhuis, 2003)).

Another method enabling non-verbal measurement of customer emotional responses is instruments that employ emojis or emoticons (Jaeger et al., 2018, 2019, 2021; Schouteten et al., 2023). Emojis and emoticons are two types of non-verbal, paralinguistic cues commonly used in computer-mediated communications to express moods and emotions, partially replacing the written language (Prada et al., 2018). Emojis are graphic symbols and emoticons are icons with typographical symbols (such as letters and numbers) that resemble facial expressions (Derks et al., 2008). Due to their widespread use, emojis and emoticons have become a promising vehicle of emotions in customer emotion research. This allows for developing tools for emotion measurement, in which words expressing various emotional states are replaced with emojis conveying a range of emotions. Despite their apparent benefits, emoji questionnaires have not as of yet been generally recognised as an alternative to word-based emotion questionnaires (Jaeger et al., 2021). Nevertheless, there is a growing number of reports in the literature confirming their usefulness. For example, a study by Schouteten et al. (2023) confirmed that the meaning of emojis is to a large extent similar in different countries, although not identical for individual emojis. Still, these authors' findings demonstrated that emojis can be used in cross-cultural research. However, a clear limitation to emoji application in research is the frequency of their use. A measurement like this can be problematic for those respondents who rarely use emojis (Schouteten et al., 2023). Furthermore, there are slight differences in emoji interpretation associated with the respondents' age (Jaeger et al., 2018). Nevertheless, emoji

questionnaires seem to be a suitable instrument to collect data among various segments of consumers (irrespective of their age and gender) (Jaeger et al., 2018; Schouteten et al., 2023). They have been effectively used in studies among adults and children, especially in food-related consumer research (Ares & Jaeger, 2017; Jaeger et al., 2018, 2021; Schouteten et al., 2023).

The interest of researchers in developing visual self-report methods largely stems from their attempts to overcome the limitations of verbal self-report methods. With the graphical solutions used, these methods can reduce language-related difficulties in verbalising emotions. Furthermore, they can increase respondent engagement and reduce biased assessments caused by fatigue. However, non-verbal self-report methods are not free of limitations. One of them, as with verbal self-report methods, is their retrospective nature. This limitation does not pertain to the third group of methods, that is, moment-to-moment rating.

Moment-to-moment rating allows for an immediate and continuous measurement of emotional responses in real time. Respondents are asked to rate a given stimulus by indicating the strength of the emotions experienced (general emotion or feeling of warmth) in relation to a (neutral) reference point. As stated by Poels and Dewitte (2006), advertising research commonly uses the ‘warmth monitor’ introduced by Aaker et al. (1986) and Stayman and Aaker (1993). This is an instrument in which respondents move a digital cursor (previously a pencil) to illustrate their emotional reactions at a given moment. Although this solution enables measurement of emotional responses immediately upon reaction to a given stimulus, it has its limitations. First of all, moment-to-moment rating tools do not result in a truly continuous measurement (Caruelle et al., 2019). This is because despite the almost real-time measurement, respondents have to analyse the emotions experienced and report them using a digital cursor. Thus, the measurement pertains only to conscious, overt emotions. This, along with the intrusiveness of the tool, may generate bias of the emotional measurement. Furthermore, the use of tools like these limits the number of emotions measured, allowing for their monitoring in a single dimension only. The respondent is only able to refer to, for example, their fear–relief reactions in real time. It is not possible for them to relate to any other continuum at the same time.

To conclude, the popularity of the traditional self-report methods for measuring customer emotions comes from the benefits related to their questionnaire-based character. The advantages and disadvantages of these methods have been extensively described in the literature (Bell et al., 2018; Couper, 2000; Felix, 2011). Their popularity stems from the fact that they are simple and convenient to use (Hertel & Hertel, 1999). They do not require any considerable time commitment to data collection and interpretation. Furthermore, they do not necessitate any additional competences or specialist data collection

equipment. Additionally, the possibility of conducting studies online allows for large-scale data collection among a diverse group of respondents.

Emotions, as a key dimension of customer experience, have been measured using self-report methods (e.g., Bustamante & Rubio, 2017; Manthiou et al., 2020; Petermans et al., 2009; Soodan & Pandey, 2016). In this context, the measurement of customer emotions usually pertained to the general and subjective *ex post* assessment of emotional states (Hosany & Gilbert, 2010; Hosany et al., 2021). For that purpose, researchers often adopted solutions based on the work of psychologists (e.g., Mehrabian and Russell's (1977) PAD scale or scales measuring basic emotions). They also attempted to develop their own tools, such as Richins' (1997) consumption emotion set or the three-dimensional Destination Emotion Scale which includes joy, love and positive surprise (Hosany & Gilbert, 2010; Hosany et al., 2015). This approach allows for scale adaptation, thus capturing emotional responses of consumers in a specific service context (e.g., mobile application user experience (Isomursu et al., 2007) and bank services (Calvo-Porrall & Lévy-Mangin, 2020)). There are also numerous publications in the literature that focus on tourist experience (Hosany & Gilbert, 2010; Hosany et al., 2021).

Nevertheless, self-report methods have certain limitations, which need to be considered when measuring customer experience. The *ex post* (retrospective) measures allow for measuring customer affective responses after and not necessarily during the experience. Due to the heterogeneity of customer experience stemming from the complexity and different duration of service provision/consumption, respondents who participate in self-report studies are asked for retrospective reports of their emotional experiences, rather than their real-time assessment. Self-reports are usually administered at particular moments, before and/or after the experience analysed (Caruelle et al., 2019). This raises difficulties related to the self-report-based continuous measurement of mixed emotions experienced during the three basic stages of a holistic customer experience. Furthermore, subjective measures only allow for measuring the perception of a conscious, subjective emotional reaction. Thus, they can capture only one part of an emotional experience (Caruelle et al., 2019). Inferencing about underlying processes requires the use of different research approaches, for example, those derived from consumer neuroscience research (Plassmann et al., 2015). Subjective assessments are likely to be associated with distortions and bias when reporting the emotions experienced (Verhulst et al., 2020). For example, the questionnaire-based approach may prompt respondents to talk about emotions they do not recall or are unaware of having experienced (Poels & Dewitte, 2006). Thus, the emotions revealed can differ from those actually experienced. Another problem is the social desirability bias (Caruelle et al., 2019; Poels & Dewitte, 2006), which is likely to affect reports of negative emotions. Yet another limitation is associated with the set of emotions measured.

To date, self-report methods used in customer experience research have largely ignored emotional diversity (Huang, 2001) and the fact that emotions vary over time in customer experience (Caruelle et al., 2024). The above-listed limitations have contributed to the development and implementation of methods measuring autonomic reactions of customers in order to measure emotions in customer experience research.

OBJECTIVE MEASURES OF EMOTIONS IN CUSTOMER EXPERIENCE RESEARCH

The majority of methods used for measuring customer emotions are based on a subjective evaluation of consciously experienced emotions (Danner & Duerrschmid, 2018). However, the complexity of emotions necessitates continuous development of methods allowing researchers to capture unconscious, automatic processes. The development of such techniques in customer experience research may shed some light on consumers' affective responses in various stages of the customer journey (before, during and after consumption) (Godovykh & Tasci, 2020).

Both researchers and practitioners analysing customer emotions are interested in seeking methodologies enabling the measurement of affective reactions (autonomic reactions, i.e., unconscious, unintentional, uncontrolled, effortless and fast reactions of consumers) (Danner & Duerrschmid, 2018). This is thanks to technological and neuroscientific advances, which make it possible to measure customer emotions by studying physiological changes (i.e., reactions in the body) (Caruelle et al., 2019, 2024; Hosany et al., 2021). Physiological and neuroscience-based approaches to measuring customer emotions allow for examining and capturing the dynamic character of emotions, thus overcoming the limitations of declarative measures (Budzanowska-Drzewiecka, 2018). They capture the automatic processes (Danner & Duerrschmid, 2018) and reduce bias associated with rationalisation (e.g., recall bias) (Verhulst et al., 2020). Furthermore, they can be used to validate the existing emotion measures (Verhulst et al., 2020). Most importantly, however, objective measures provide information about temporary bodily reactions occurring at a specific moment in time. They can be designed in such a way as to measure emotional responses in real time, and thus point to temporal changes in these responses. In other words, the methods allow for capturing the responses to the actual stimuli experienced holistically at every touchpoint (an experiential episode; Bastiaansen et al., 2019) in real time (Becker & Jaakkola, 2020; Caruelle et al., 2024).

Physiological and neuroscience-based methods used in marketing and consumer behaviour research form an extensive and varied group of measures

and techniques examining various changes in the human body. The available solutions enable the measurement of changes in neurons, muscles or glandular cells at a specific time (Godovykh & Tasci, 2020). This allows for analysing physiological parameters, brain responses or facial expressions (Danner & Duerrschmid, 2018). There are numerous techniques and instruments offered by companies specialising in the analysis of physiological and/or neuronal consumer responses (e.g., Bell et al., 2018), for example, FaceReader (Skiendziel et al., 2019; Wawrzyński & Marszałek-Kawa, 2023). These techniques can be grouped into different categories (Bastiaansen et al., 2019; Khare et al., 2024; Lim, 2018). They involve the measurement of brain activity, and physiological and physical signals. The first category measures the metabolic (e.g., functional magnetic resonance imaging (fMRI), positron emission tomography) or electrical (e.g., electroencephalography (EEG), magnetoencephalography) brain activity (Alsharif et al., 2021; Cherubino et al., 2019). The next two focus on other reactions of the body. Physiological measurement (e.g., heart rate, skin response) employs an electroencephalogram, an electrocardiogram, galvanic skin response measures and eye tracking (Alsharif et al., 2021; Cherubino et al., 2019; Khare et al., 2024). The last category, physical measurement, comprises tools for the analysis of physical signals involving speech and facial expressions (Khare et al., 2024), for example, facial expression recognition and electromyography.

Brain Activity Measurement

A significant group of the objective measures is rooted in consumer neuroscience research, which applies tools and theories from neuroscience (Plassmann et al., 2015). The focus of the neuroscience-based approach is the analysis of brain activity using neuroimaging tools. Their application in the measurement of emotions in customer experience requires expertise in brain function, which is what neuroscience centres on, but goes beyond the scope of marketing. According to Plassmann et al. (2015), this is what makes these methods less widespread, despite the fact that practitioners and researchers express strong interest in them. Numerous researchers involved in consumer neuroscience research have published conceptual and review papers (e.g., Alsharif et al., 2023; Costa-Feito et al., 2023; Cruz et al., 2016; Fortunato et al., 2014), but studies that would actually employ these methods are scarce (Lim, 2018).

Marketing and consumer behaviour research uses several neuroimaging tools measuring the electrical and magnetic activity of the brain (Lim, 2018). The greatest interest has been evoked by fMRI and EEG. These techniques have been applied in studies investigating consumer responses to advertising (Ambler et al., 2000; Cartocci et al., 2016; Cook et al., 2011; Lamme & Scholte, 2013), including those analysing emotional states (Vecchiato et al.,

2014). The list of tools does not end here. It also includes magnetoencephalography or positron emission tomography (Alsharif et al., 2021; Bell et al., 2018; Lim, 2018). The use of neuroimaging tools in consumer research has been described in the literature, providing knowledge about the limitations, benefits and potential applications of these techniques (Clithero et al., 2024; Karmarkar & Plassmann, 2019; Plassmann et al., 2015; Singh et al., 2013). Even though the neuroscience-based approach has been deemed promising, it is still not widely used in consumer behaviour research (Clithero et al., 2024).

Of the existing neuroimaging tools, the most popular are EEG and fMRI (Alsharif & Mohd Isa, 2024; Alsharif et al., 2023; Clithero et al., 2024; Khondakar et al., 2024; Plassmann et al., 2015; see Table 5.2).

EEG and fMRI can record and analyse changes in the activity of specific brain regions during concrete tasks performed by the subject, that is, in response to specific stimuli. Both these methods are non-invasive and safe and they do not require administration of any substances to the subject (Lim,

Table 5.2 *Characteristics of major neuroimaging techniques measuring customer emotions*

Criterion	Electroencephalography	Functional magnetic resonance imaging
Cost and workload	Lower cost, time-consuming	Very high cost, time-consuming
Measurement conditions	Portable device, greater flexibility in choosing the study site, lower burden of the study procedure	Stationary device, measurement under artificial, arduous laboratory conditions
Potential for measuring responses to stimuli	High temporal resolution, low spatial resolution Measures rapid changes in neuronal activity on a millisecond scale	High spatial resolution and low temporal resolution Differentiates signal from the neighbouring areas of the brain
Researcher's competences	Expertise in data interpretation, qualified operator	Expertise in data interpretation, qualified operator
Potential for use in customer experience research	Can serve as a more accurate objective measurement of emotions due to the lack of conscious manipulation of the EEG signal by the subject Can be used to monitor experience in stores and in social settings	Problematic due to the stationary nature of measurement, identifies the neural processing region during consumption experiences

2018). fMRI relies on the assumption that more active regions of the brain require more oxygen to sustain metabolic processes, which can be determined based on the cerebral blood flow (haemoglobin) (Alsharif & Mohd Isa, 2024; Bell et al., 2018). In turn, EEG registers the electrical activity of the brain. It can register waves of various frequencies, such as delta (δ), theta (θ), alpha (α), beta (β) and gamma (γ), which correspond with different physiological responses, including emotional reactions (Khondakar et al., 2024). For instance, alpha frequency bands distinguish between positive and negative emotional reactions and beta frequency bands are associated with changes in emotional arousal (Khondakar et al., 2024).

The two techniques provide different types of data. EEG is characterised by high temporal resolution, enabling measurement in hundredths of a second. At the same time, it has low spatial resolution, making it impossible to determine which region of the brain produced the signals (Guixeres et al., 2017). In contrast, fMRI offers high spatial resolution and lower but acceptable temporal resolution (Bell et al., 2018; Venkatraman et al., 2015). However, with this technique it is difficult to attribute brain activity to specific stimuli in short time intervals (shorter than 2–3 seconds). This might be a limitation when tracing brain activity changes associated with the processing of visual and acoustic stimuli in temporal resolution on the order of milliseconds to determine which stimuli are more or less interesting to the respondent (e.g., commercials). On the other hand, based on the patterns of signal timing and frequency, EEG can provide specific descriptors of cognitive processes in the subjects (Vecchiato et al., 2012). Currently, this is the only brain activity measure that can identify specific elements of the message that attract the attention of the viewer. EEG allows for making inferences about attention and affect, whereas fMRI can, through identification of the activated brain region, offer some clues on attention, affect and recall (Venkatraman et al., 2015).

In the case of both these techniques, study implementation requires expertise from the researcher and adequate testing procedure preparation. For example, EEG requires careful preparation of the subject's scalp, attachment of a set of electrodes and control of the measurement conditions (Lin et al., 2018). Signals can be easily lost, for example, when the subject sneezes. Also, during fMRI the subject has to lie in a loud and claustrophobic machine. Such measurement conditions raise doubts about the accuracy of measurements performed in this artificial and unrealistic setup. In the case of EEG, it is possible to collect data using a portable device, which partially removes these doubts. However, it needs to be emphasised that this technique is sensitive to external factors (e.g., signals generated by electrical devices, noise) or those related to uncontrolled movements of the subject.

Physiological Measurement

The second category of objective measures used to make inferences about emotional responses includes physiological or biometric measurement methods (Berčík et al., 2025). These techniques register neural activity outside the brain (Lim, 2018), focusing on the measurement of physiological reactions stemming from the activity of the autonomous nervous system (body responses), such as pupillary reactions, skin conductance and heart rate or blood pressure and finger temperature (Hertel & Hertel, 1999; Poels & Dewitte, 2006). Different psychophysiological methods are associated with the dimensional approach to emotions (e.g., valence and arousal) (Li et al., 2015). They offer different ways of inferencing about an individual's emotions. For example, pupillary reactions are correlated with emotional processing, while electrodermal and cardiovascular reactions are respective indicators of emotional arousal and valence (Sequeira et al., 2009). Researchers can choose from a wide range of solutions for body response measurement (Alsharif et al., 2021; Cherubino et al., 2019; Li et al., 2015; Verhulst et al., 2019, 2020). For example, they can measure heart rate with an electrocardiogram, electrodermal activity (skin conductance response, called galvanic skin response in the past) with a galvanometer (Caruelle et al., 2019; Sequeira et al., 2009) or pupillary reactions with an eye tracker.

According to Caruelle et al. (2019), the accessibility of devices recording electrodermal responses has led to an increased interest in the measurement of these responses in consumer emotion research. Electrodermal activity is an indicator of emotional arousal (Caruelle et al., 2019; Sequeira et al., 2009). It allows for analysing emotional arousal in real time based on body responses. Furthermore, the measurement does not require subjects to verbalise their emotions. These characteristics help to overcome the already discussed limitations of self-report measures in customer emotion research, associated with failure to address unconscious emotions, alexithymia, that is, the inability or reluctance of respondents to report their emotions, and difficulties with a continuous emotional measurement (Caruelle et al., 2019; Mauss & Robinson, 2009). However, it needs to be noted that when adapted to measure customer emotions, this technique does not provide information about valence (Karmarkar & Plassmann, 2019; Li et al., 2015). Importantly, rapid advances in electrodermal activity measurement require regular updates of knowledge about the currently bidding guidelines regarding electroderman activity application. Guidelines on the use of electroderman activity measurement have been systematised by Caruelle et al. (2019).

Another real-time measure of arousal is heart rate response (Bell et al., 2018; Li et al., 2015). The method consists in measuring the number of heartbeats within a specific time interval, usually within 1 minute (Li et al., 2015). This is

done by placing a heart rate monitor on the respondent's wrist, near the radial artery (Poels & Dewitte, 2006). The measurement can be performed in laboratory conditions and in naturalistic settings (Bell et al., 2018). Importantly, heart rate response allows for measuring the valence of emotions. Heart rate decreases when the subject is exposed to negative stimuli and increases in response to positive ones (Li et al., 2015). However, due to validity issues and problems with the accuracy of interpretation when used as a stand-alone technique, it is recommended to use heart rate response measurement as a complementary method in combination with other autonomic measures (Li et al., 2015).

Physiological measurement also includes eye-tracking measures. Eye tracking registers the number of visual fixations and their duration in response to a stimulus (Duchowski, 2017), in both stationary and mobile situations. It is often used as a supplementary technique to other psychophysiological methods (Li et al., 2015). For instance, in their study on e-commerce applications, Märtin et al. (2023) used eye tracking in combination with emotion recognition and other individual tracking methods.

Facial Expression Recognition

The last group of objective measures allows for recognising emotions revealed through facial expressions. These methods can identify a number (albeit limited) of discrete emotions (Martinez et al., 2016). This group covers both facial muscle activity (electromyography) and facial expression analysis (Bell et al., 2018). The recognition process can be carried out by a human or automatically, using artificial intelligence algorithms (Danner & Duerrschmid, 2018; Fasel & Luetttin, 2003). Facial electromyography measures and evaluates the physical properties of facial muscles, such as voluntary and involuntary responses. It is a useful method to examine the valence of affective reactions (Li et al., 2015). In turn, facial expression measurement allows for classifying facial expressions as specific emotions based on the judgement of the observer. Facial expressions are grouped into a specific number of emotional categories based on the ratings of coders, usually by calculating the mean value of the raters' (coders' or judges') responses. Advances in emotion recognition technology and research have fostered the development of automated facial expression analysis systems, whose algorithms attempt to map facial expressions directly into specific emotions (Fasel & Luetttin, 2003). This technology is often based on the Facial Action Coding System developed by Ekman and Friesen (Ekman & Rosenberg, 2005), which describes facial muscle movements, thus enabling categorisation of facial movements to more accurately determine the subject's emotional state. Automated facial expression analysis has been used for

measuring emotions in consumer studies (Danner & Duerrschmid, 2018) and it has also been employed in customer experience research.

Despite its rapid development, automated facial expression analysis has its limitations and requires discussion on the principles of methodological rigour. Its controversial character is associated with the unexplained dilemma of whether or not facial expressions are a precise indicator of emotions and whether facial expressions are universal or culture-specific (Jack et al., 2012). Research on facial expressions has evolved over time. Consequently, facial expressions are no longer regarded as static portrayals of six emotions, but as multimodal, dynamic behavioural patterns (Keltner & Cordaro, 2017). Furthermore, the very quantification and objective description of facial expressions is a difficult task (Hamilton & Allard, 2023; Martinez et al., 2016), especially in the case of automated facial expression analysis. The complexity of facial expression analysis stems from the differences in facial features in people of different ages, ethnicity and gender (Hamilton & Allard, 2023). What is also important is whether facial expressions are accompanied by body cues (Aviezer et al., 2012). Moreover, people's faces look different depending on lighting or positioning. The list of factors that need to be addressed in automated facial expression analysis is much longer (Danner & Duerrschmid, 2018; Hadinejad et al., 2019b; Yu & Ko, 2017). Danner and Duerrschmid (2018) systematised the basic conditions for its application, emphasising that the effectiveness of these tools depends on the quality of the material studied (photographs or videos). Meeting these requirements in laboratory settings might not be a problem. Natural settings, however, may be more of a challenge. For example, when measuring customer experience during the service consumption process, study participants may move into areas with different lighting conditions or cover those parts of the face that are important for the measurement. Despite these limitations, Danner and Duerrschmid (2018) believe that the greatest advantage of this approach is improved ecological accuracy. This stems from the possibility of analysing facial expressions in real time, in natural settings and without interfering with the behaviour of the subject.

The popularity of automated facial expression analysis is due to the accessibility of commercial solutions, which make it possible to implement this approach in consumer and scientific research (Danner et al., 2014; Lewinski et al., 2014). There are numerous automated facial expression analysis systems available in the market, for example, NVISO (NVISO SA, Lozanna, Switzerland) or Affectiva (Affectiva, Waltham, United States) (Danner et al., 2014). One of the most popular facial expression recognition tools is FaceReader offered by the Dutch company Noldus. The software is based on the taxonomy of human facial muscle movements (Berčík et al., 2025; Ferreira et al., 2021; Lewinski et al., 2014; Skiendziel et al., 2019; Wawrzyński & Marszałek-Kawa, 2023).

In summary, researchers interested in measuring emotions in customer experience have numerous methods at their disposal, including both traditional subjective self-report measures and objective neurophysiological measures capturing automatic and autonomic reactions. The use of neurophysiological measures in advertising research allows for overcoming some limitations associated with traditional measurement approaches and vice versa. In addition, compared with traditional self-report measures, neurophysiological measurements can be conducted continuously. However, although neurophysiological measures may be more objective in reflecting individuals' emotional responses as compared to self-report methods (Li et al., 2015), they are controversial in terms of ecological validity (Bastiaansen et al., 2019). Each of these methods explores different emotional aspects. Thus, it seems justifiable to use them in combination to get a fuller understanding of emotional responses.

6. Challenges of measuring mixed emotions in customer experience research

Like with any other subject, researchers measuring emotions in customer experience have to make numerous decisions and face multiple challenges. These are of different character depending on whether the subject matter is to be analysed from the practical or scientific perspective. In the former case, professionals focus on a specific context associated with a product, brand or industry to offer solutions that would satisfy customer expectations and provide experiences that build competitive advantage. Thus, emotion measurement allows for designing customer experience accordingly. As for the scientific perspective, scholars are interested in developing advanced methodologies that would provide insights about the role of emotions in consumer behaviour, or more broadly, human behaviour. There are various reasons why both scholars and professionals want the research conducted in this area to meet the requirements of methodological rigour. Currently, despite the advances in customer experience research, the problem lies not only in the complexity of emotions, but also in the lack of unambiguous nomenclature in customer experience (De Keyser et al., 2020; Godovykh & Tasci, 2020; Lemon & Verhoef, 2016) and a common understanding of its nature. Holistic customer experience research involves analysing the reactions of consumers throughout the entire consumer journey, including its three general stages: before, during and after purchase/consumption (Lemon & Verhoef, 2016). Consequently, the measurement of emotions in customer experience should take account of the diversity and dynamic character of these three stages, regardless of whether a single method or a combination of methods is used. Consumer emotion researchers need clear guidelines on the principles of measuring emotions in consumer experience (Caruelle et al., 2019), especially on methods that use increasingly abundant and varied types of data which can be accessed as a result of technological change (e.g., big data). Thus, methodological issues require further development and recommendations in search of the gold standard.

The pursuit of capturing emotional states in customer experience not only extends the existing knowledge, but also drives the development of methods,

especially those based on technological advances. The development of artificial intelligence (AI)-based techniques allows for using these achievements to measure emotions but, at the same time, remains controversial.

Thus, synthesising the findings from the previous chapters, we can group the challenges faced by researchers who attempt to measure emotions in customer experience into two categories. The first is associated with research design and implementation (methodological issues). The second pertains to the necessity of testing new solutions available to researchers and discussion about the ethical principles of their application (innovation adaptation issues). One of the threads in this debate is the issue of AI's potential for recognising emotions (Khare et al., 2024).

METHODOLOGICAL CHALLENGES RELATED TO MEASURING EMOTIONS IN CUSTOMER EXPERIENCE STEMMING FROM METHODOLOGICAL RIGOUR

The complex nature of emotions and the interdisciplinarity of customer experience research necessitate the development of standards that would enable capturing emotions in a holistic customer experience, which is not an easy research task (Budzanowska-Drzewiecka & Lubowiecki-Vikuk, 2023). Given the interdisciplinarity of research on emotions, continuous progress in this field and diversity of tools that measure emotions (Mauss & Robinson, 2009), the discussion about methodological issues is vitally needed. Researchers need a common understanding of how to conceptualise emotions in consumer experience and when and how to use different emotional measures. In addition, they need to know whom to include in their research (Figure 6.1).

The list of challenges is much longer. One of them is the question of integrating data obtained through various measurements. However, the subsequent part of this chapter focuses only on the challenges listed above.

Challenge 1: How to Conceptualise and Operationalise Emotions in Customer Experience Research?

Appropriate conceptualisation and measurement of emotions are important for understanding customer experience. Various conceptualisations of customer experience translate into different operationalisations of this concept depending on the study. Hence, emotions – as one of the components of customer experience – are operationalised in different ways (Becker & Jaakkola, 2020). For this reason, the first methodological dilemma that needs to be addressed by researchers designing a study measuring emotions in customer experience pertains to the conceptualisation and operationalisation of emotions. This necessitates a decision on a specific way of defining emotions. This decision

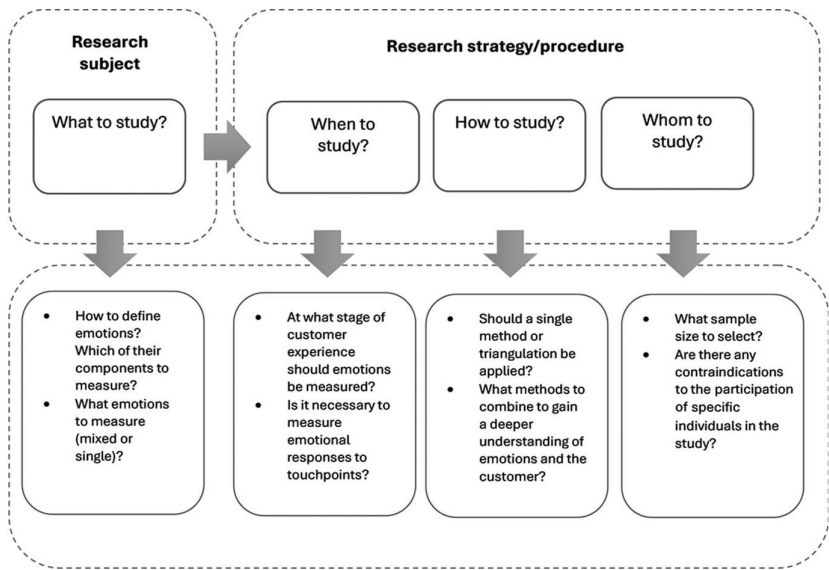


Figure 6.1 Main challenges for researchers in measuring emotions in customer experience research resulting from the research process

will ultimately lead to the selection of a specific way of measuring emotions in customer experience. For example the assumption that emotions refer to subjectively experienced states will consequently lead to the selection of self-report measures and the dimensional or categorical approach. Thus, conceptualisation and operationalisation of emotions in customer experience requires (1) an unambiguous definition of emotions and (2) determination of the number of emotions to be measured simultaneously.

Studies on the role of emotions in customer experience predominantly focus on the emotional responses of customers to stimuli in the form of the market offer or specific touchpoints. Researchers assume that emotions are the customer’s response to these stimuli. However, this subject is much broader, allowing a different perspective. Following the development of social media, customers can share their emotions triggered by past experiences using electronic word-of-mouth communication (e.g., online customer reviews). Analysis of these statements can also provide information about emotional valence and discrete emotions (Budzanowska-Drzewiecka, 2023, 2024).

Researchers must decide whether they are going to focus exclusively on conscious emotions or on unconscious emotions as well. Emotions in customer experience research are usually conceptualised in both dimensional and

categorial terms (Hosany et al., 2021). Likewise, these solutions are commonly used in emotion research (Mauss & Robinson, 2009). Both allow for measuring one type of emotions or mixed emotions, but in a different way. With the dimensional approach, researchers have to decide whether to focus on positive or negative emotions, whereas in the case of the categorial approach, they can focus on specific discrete emotions.

The question of how many emotions to study and which of them to focus on is one of the fundamental issues that divides customer emotion researchers (Meiselman, 2021). Customers experience numerous emotions during their interactions with service providers (Calvo-Porrall & Lévy-Mangin, 2020). They can simultaneously feel mixed emotions in one specific stage of the experience, but they can also feel different emotions when moving from one stage to another (Calvo-Porrall & Lévy-Mangin, 2020). The decision on how many and which emotions to investigate will determine not only the method, but also the accuracy of measurement. An excessive number of emotions to be measured may overwhelm and discourage the respondent in the case of self-report measures. Furthermore, it may exclude those methods that do not allow for their recognition and measurement (e.g., FaceReader can only recognise basic emotions). The need to consider the number of emotions to be included in the study prompts researchers to focus on the context of the experience being analysed. All the more so since, as proposed by Hosany et al. (2021), the psychology-based measures of emotions do not capture the specific characteristics of tourists and destinations. This raises a question whether a simple adaptation of a specific concept of discrete emotions (e.g., Ekman's basic emotions) can capture emotions specific to a given context of consumption experience, which is very subjective (Becker & Jaakkola, 2020; Duerden et al., 2015).

In summary, the decision about the conceptualisation and operationalisation of emotions should be motivated by the study objective. The measurement of emotions in a holistic customer experience requires focusing on diverse emotions, which does not necessarily correspond to the dimensional or categorial approach. The measurement of mixed emotions entails capturing changes in emotional responses throughout the entire consumer journey. Previous studies successfully applied the dimensional, valence-based approach. To gain a better understanding of customer experience, it is justified to develop the categorial approach, which allows for investigating the diversity of emotions of the same valence. However, their number and measurement method should provide balance between the need to fit into a specific consumption context and the pursuit of universal emotional measures.

Challenge 2: At What Stages of Customer Experience Should Emotions Be Measured?

A holistic customer experience comprises three major stages of consumer experience: before, during and after purchase (Lemon & Verhoef, 2016). Thus, a natural dilemma faced by researchers involves discussing their time-related aspects and selection of the stage at which emotions will be measured. This raises the question whether emotions should be measured post-experience (retrospectively) or during an experience (continuously, *in situ*) (Bastiaansen et al., 2019; Hosany et al., 2021). Sometimes, the study objective may warrant pre-experience measurement (Le et al., 2020). Assuming that emotions can be experienced throughout a long-term relationship with the service provider/brand (Calvo-Porrà & Lévy-Mangin, 2020), they may not only be felt on a one-off basis before purchase, during the interaction with the service/product and after purchase but may also form the basis for developing a specific attitude towards that service provider/producer as a consequence of previous consumption experiences. Thus, the measurement of emotions in customer experience may have a retrospective, current (moment-to-moment) and prospective character. Again, the selection of the right moment to measure emotions depends on the study objective and requires consideration of the limitations of data obtained in this way. Customer experience has most often been studied retrospectively upon the completion of the consumption stage (Becker & Jaakkola, 2020), despite the growing number of recommendations to use real-time measures capturing all stages of consumption.

Retrospective measurement (*ex post* experience) takes place after purchase, that is, once the customer has gone through the entire customer journey. It is mainly carried out with the use of self-report measures. However, what is often criticised and stressed are the retrospective biases in reporting emotions (Robinson & Clore, 2002), associated with, for example, the ability to memorise and recall the emotions experienced by the respondent (Aaker et al., 2008). Researchers often provide respondents with cues facilitating the recall of specific events (Hosany et al., 2021). Real-time reporting of emotions is believed to be more reliable than retrospective reporting, which takes place long after a given experience has occurred (Mauss & Robinson, 2009; Robinson & Clore, 2002). What is important, however, is the time interval between the experience and the measurement. Measurement performed shortly after the experience helps to offset emotional suppression. Furthermore, emotions measured retrospectively are more complex, as they include the assessment of the entire activity (Hetland et al., 2018). When recalling emotions, particularly mixed emotions experienced in the past, respondents often underestimate their intensity, which does not occur to the same extent with unipolar emotions. Additionally, this effect increases over time (Aaker et al., 2008). These

limitations have been observed, with varying intensity, in customer experience research. For example, a study by Feldman Barrett (1997) showed that retrospective ratings of emotions contained exactly the same information as momentary emotion reports provided by respondents. In contrast, research on the experiences of patients demonstrated that they suppress their emotions and modify/regulate their expressive behaviour during the treatment experience (Danaher et al., 2024).

The second approach involves an in-process measurement of emotions during a holistic consumer experience. This allows researchers to go beyond the understanding of emotions as a single state (Verduyn et al., 2015) and measure their dynamics (Guo et al., 2024), showing changes and fluctuations of emotions during the entire process over time. However, such measurement often requires the use of physiological and neuroscience methods, whose major drawback is the artificial setting in which they are used. This, in turn, reduces their ecological validity. Another solution is the development of diary methods (Gershuny et al., 2020; Liu et al., 2016).

Challenge 3: What Methods Should Be Used to Measure Emotions in Customer Experience Research? How to Combine Them?

The fundamental issue related to the measurement of emotions in customer experience research is the question of choosing proper measurement techniques. The question of what are the best methods to study emotions has no straight answer. Their selection stems from the awareness of their potential, conditions for use and limitations (including those associated with insufficient competences of the researcher). The main issue pertains to the number of methods that should be used to capture the emotional responses of customers: one or several. The methods and techniques available to researchers to measure subjective, physiological and behavioural emotional responses are complementary and should not be treated as substitutes. They have different applications. Thus, capturing the complexity of emotional states of customers in a holistic experience requires the triangulation of measurement methods (Godovykh & Tasci, 2020; Hadinejad et al., 2021; Hosany et al., 2021). Therefore, a discussion is needed on the sequence of methods that best capture the complexity of emotions in customer experience. One of the solutions recommended in emotion research involves the combination of verbal and non-verbal measures (Lazarus, 1991). Its adaptation for the measurement of mixed emotions in a holistic customer experience consists in combining self-reported measures with other approaches, for example, those derived from neuroscience (Godovykh & Tasci, 2020; Hadinejad et al., 2021). This approach allows for overcoming some of the limitations of individual measurement methods (Smith, 2017). Consequently, it requires the development of methodologies

and implementation of various approaches to measuring emotions in customer experience research. Although physiological and neuroscience methods for the measurement of emotions have been increasingly applied in customer experience research, there is still a need to systematise the benefits and limitations associated with the triangulation of emotion measurement methods. The majority of publications discuss specific characteristics of individual measures (Bastiaansen et al., 2019; Hadinejad et al., 2019b; Khare et al., 2024). However, the integration of methods also requires overcoming limitations that constitute barriers to the use of measures other than self-report methods, mostly verbal, in emotion research. Their list is long (Clithero et al., 2024; Li et al., 2015). First, it is essential to understand what responses can be measured by what methods and to consider other available methods besides neuroimaging. This leads to allegations concerning insufficient competences of researchers (Li et al., 2015). Second, method integration can form the basis for formulating different research questions, allowing researchers to capture the holistic viewpoint of the consumer. However, this is not often practised (Clithero et al., 2024). Third, it is necessary to develop standards for conducting and reporting customer experience research, employing physiological and neuroscience methods to ensure its replicability and comparability (Plassmann et al., 2015).

Another challenge relates to the choice of a specific tool for the measurement of emotions in customer experience research. While in the case of physiological and neuroscience methods researchers only have to select a specific tool, self-report measures often require scale adaptation or development. This means that researchers not only have to decide on the type and number of emotions to be measured, but also consider numerous details, for example, whether the scales should be unipolar or bipolar (Hosany et al., 2021) or how to incorporate this component in the customer experience measuring tools. The potential direction for advancing self-report measures should focus on the development of a tool measuring a holistic customer experience before, during and after purchase, including the emotions associated with that experience (Becker & Jaakkola, 2020).

Challenge 4: Whom to Study to Capture Emotions in Customer Experience Research?

The last of the signalled procedural challenges facing researchers attempting to capture emotions in customer experience research is the problem of sampling and proper preparation of the respondents participating in the measurement. This is a detailed issue associated with the standards for conducting and reporting studies employing physiological and neuroscience methods. These methods are not widely used and the small study samples they include have often been called into question. The small size of study samples stems from

the similarities in physiological responses and ensures data reliability. This poses a challenge for method triangulation. While small samples are appropriate for physiological and neuroscience methods, they are insufficient for the self-report measures included in triangulation, which may raise concerns about the statistical significance of the observations. Furthermore, participants included in studies employing physiological and neuroscience measures need to be selected in such a way as to meet the condition of the study's internal validity (e.g., regarding past illnesses, current health status, right-handedness of participants, etc.). Thus, it is important to properly organise the enrolment process. Consequently, the enrolment questionnaire should include questions, specific to a given measurement technique, which would allow for excluding individuals who do not meet the inclusion criteria.

ADAPTATION OF TECHNOLOGICAL INNOVATIONS FOR USE IN CUSTOMER EXPERIENCE RESEARCH

The rapid development of digital technologies, big data and AI techniques is providing new challenges and opportunities in customer experience research. There is an emerging need to analyse service experience in immersive technology or phygital environments. Thus, the challenges facing researchers studying emotions in customer experience, apart from those associated with methodological issues, can also be viewed from the perspective of the potential opportunities and risks of adapting technological innovations to marketing (Mariani et al., 2023), including to customer experience (e.g., a new concept known as AI-enabled customer experience; Ghesh et al., 2024; Wang et al., 2024) and emotion measurement at different stages of consumption. Of these, a prominent place is taken by the debate on AI-based technologies. The implementation of AI has been studied in the context of marketing management as well as consumer behaviour and analytics (Mariani et al., 2023). However, the list of technological innovations tested in customer experience measurement is longer and not limited to the discussion of AI's potential. These innovations are associated with, for example, the need to consider ways of measuring emotions during multisensory virtual experiences resulting from the development of virtual reality (VR) and augmented reality (AR) technologies. A conceptual framework for their use in research has been proposed by Wedel et al. (2020). In turn, Magalhães et al. (2024) conducted a systematic literature review of methods and instruments used to measure emotions among users of VR providing immersive virtual experiences. Even though measuring emotions in virtual experiences employs the same methodological solutions as those applied in non-virtual settings, in particular specifically designed questionnaires, these methods have to include emotional responses during specific multisensory immersive VR experiences. Magalhães et al. (2024) also indicated the main

limitations of emotion research in multisensory VR, associated with the VR equipment used (e.g., intrusiveness and social interaction inhibition), methods used to study emotions in VR (i.e., subjective, objective measures and mixed-method approach) and the experimental design (e.g., lack of triangulation, incongruence between the stimuli). While the latter two groups of limitations are common to emotion measurement in customer experience in other contexts, those related to VR equipment pertain directly to the specific character of virtual experiences. The VR equipment used may hamper the evaluation of users' emotional responses, such as facial expressions or gestures, as it covers a significant part of the face. Another limitation is that respondents have to remove the VR headset after each part of the measurement to answer questions unless an in-VR questionnaire is used.

An alternative way of measuring customer experience in AR, VR and the Metaverse, otherwise known as immersive technology experiences, has been proposed by Kozinets (2023). He suggests the need to develop immersive netnography, which allows for studying experiences in immersive technology environments. Kozinets proposed practices for data collection and analysis and ethical principles, starting a discussion on using this approach in holistic customer experience research.

Another challenge related to innovation adaptation issues in customer experience research stems from the phygital customer journey comprising physical and digital interactions (Mele et al., 2024), which is possible due to the exploitation of smart technologies (Mele et al., 2023). Examining consumer experiences in hybrid physical–digital realms appears to be one of the directions for the development of research in this area. Batat (2024a) goes so far as to claim that these experiences require a separate research paradigm. What is needed is not simply an alternative interaction channel, but a change in the approach to conceptualising experiences in which, due to online and offline interactions, the boundaries between the physical and digital worlds are blurred (Mele et al., 2021). Consequently, this requires reconsideration of the research on the emotional component of thus understood experiences.

Nevertheless, despite the challenges associated with the innovation adaptation issues in customer experience research, researchers are enticed by the possibilities offered by AI-based technologies (Ghesh et al., 2024; Huang & Rust, 2024; Khare et al., 2024; Marechal et al., 2019; Ülgen Sonmez & Varol, 2024). In particular, AI has potential for mining unstructured multimedia data (e.g., images, text (Marechal et al., 2019) or speech (Guo et al., 2024; Ülgen Sonmez & Varol, 2024)), forming the record of customer experience and for recognising emotions. The development of generative AI has expanded the possibilities for recognising and understanding emotions. For example, AI systems are being designed in such a way as to enable empathic interaction with people, that is, feeling intelligence (Huang et al., 2019) or affective computing

(Marechal et al., 2019). Based on the analysis of the user's emotional data, such machines, referred to as Feeling AI, are expected to understand emotions and thus improve their own ability to communicate and interact with people (Huang et al., 2019). This potential can be used in research projects and implemented in marketing practice, for example, in customer service. For instance, Huang and Rust (2024), referring to the capabilities of generative AI, proposed a conceptualisation of the customer care journey, which focuses on the emotional aspect. They distinguished four stages of this journey: emotion recognition; emotion understanding; emotion management; and emotional connection.

The potential of previous generations of AI has been discussed in the context of emotion recognition (Huang & Rust, 2024; Khare et al., 2024). This ability is believed to have formed the basis for the development of automated content analysis, especially sentiment analysis (Cambria et al., 2017; Huang & Rust, 2024; Kim & So, 2024), and emotion recognition in spoken or expressed language or facial expressions. Nevertheless, there are also critical voices in the discussion. For example, Feldman Barrett (2022) emphasises that AI does not detect emotions but only physical signals, such as facial muscle movements, without recognising the psychological meaning of these signals. The author believes that facial muscle movements are not clearly associated with specific emotions. Thus, the same emotion can accompany various facial movements and the same facial movements can have different (or no) emotional meaning. What is also controversial is the ability of algorithms to predict the personal attributes of consumers based on facial images (Kosinski, 2021; Kosinski et al., 2013). These algorithms can admittedly improve human–technology interactions, allowing machines to recognise people's gender, age or emotional state and adjust their behaviour accordingly (Kosinski, 2021). However, they can also predict much more sensitive traits (e.g., personality, sexual orientation, religious views), invading people's privacy (Kosinski et al., 2013). Despite the criticism of such tools, automated facial expression analysis is enjoying a growing interest among researchers.

Depending on the type of data that forms the basis for emotion recognition, researchers face different dilemmas. In the case of speech emotion recognition, for example, the major challenge is to obtain data which contain relevant information on the emotional status of the speaker (Ülgen Sonmez & Varol, 2024). The difficulty stems from, for example, differences in language, age and gender of the speaker, but also a lack of standards for creating datasets or differences in the number of emotions being recognised.

PART III

Measuring emotions in a holistic customer experience: self-report approach

Introduction to Part III

Measuring emotions as key components in a holistic customer experience poses a challenge for researchers. One of the dilemmas when studying customer experience involves developing measurement methods that would capture not only the complexity and dynamics of customer emotions but also the context of the experience analysed. The few methodological approaches used for measuring emotions in customer experience (including tools and scales) that are recommended in the subject literature are contextual in nature. Therefore, any discussion of various approaches towards measuring emotional states in customer experience requires the analysis of specific cases. These may pertain to purchasing or consuming goods and services offered by various industries. In order to present the potential and limitations of different methodological approaches to measuring emotions in customer experience, we have focused on a specific service category, hedonic services, considered in various service environments. Hedonic versus utilitarian services are two different types of services distinguished on the basis of the motives for their purchase and consumption. Hedonic services are mostly consumed for hedonic reasons (consummatory affective gratification). By contrast, utilitarian services (or goods) are consumed for instrumental reasons (Batra & Ahtola, 1991). Hedonic services are associated with increased arousal and heightened involvement (Hellén & Sääksjärvi, 2011). They provide consumers with an experience of pleasure and joy (Dhar & Wertenbroch, 2000; Hirschman & Holbrook, 1982) and have the potential to evoke emotions (e.g., Calvo-Porrà & Otero-Prada, 2021; Song & Qu, 2017).

Part III aims to present research findings demonstrating the possibilities of measuring mixed emotional states in a holistic customer experience based on traditional self-report and retrospective (*ex post*) questionnaire-based measures. Such an approach to measuring emotions has a long tradition in consumer behaviour research (Desmet, 2018; Poels & Dewitte, 2006; Soscia, 2013). To measure a holistic customer experience, cognitive and affective dimensions need to be addressed together. However, combining discrete emotion measures with customer experience measures is not a common and well-established practice. This task requires a tool to capture emotions in the different stages of customer experience. To do so, we adopted the extended Customer Experience

Quality scale originally developed by Klaus (2015). This scale (Kuppelwieser & Klaus, 2021) was revised and supplemented with items referring to mixed customer emotions (Gerhart & Oh, 2024; Oh & Tong, 2022). The need to adapt the instrument stemmed not only from linguistic reasons but mainly from the context of the study, which concerned aesthetic medicine and plastic surgery services that fall into the category of hedonic services. Moreover, aesthetic medicine and plastic surgery services allow for capturing a holistic customer experience before, during and after consumption.

7. Exploring emotions in a holistic customer experience: a case study of aesthetic medicine and plastic surgery consumers

The need to develop methods for measuring emotions in a holistic customer experience is clearly evident in both research and practice. Even though consumer emotions are often studied in marketing research, there are not many tools that would capture emotions when measuring customer experience. The methodological approaches to measuring emotions in customer experience described in the literature are contextual in nature. Therefore, it is necessary to decide on the subject of one's study, that is, the type of product or service whose consumption produces customer experience to be analysed.

Study 1 constitutes proof-of-concept research on using verbal self-report and retrospective (*ex post*) questionnaire-based measures to determine emotional states in a holistic customer experience. During the conceptualisation process, we selected hedonic services as the subject of the study (Calvo-Porrall & Otero-Prada, 2021; Hellén & Sääksjärvi, 2011). Within this category, we searched for such services that would allow a holistic customer experience to be captured and which could evoke various emotions themselves (high-emotional service settings). Ultimately, we chose health services. Their consumption is associated with different motives, both hedonic (e.g., improving physical appearance) and utilitarian (e.g., saving health). We decided to focus on a specific case – aesthetic medicine and plastic surgery services. This particular type of health service intended for commercial customers (except for health-saving visits) is associated with the customer's stay at a clinic. Its main goal is to improve the physical attractiveness of the consumer (patient) by means of invasive and non-invasive (sometimes minimally invasive) procedures (Prendergast & Shiffman, 2011). The consumption of aesthetic medicine and plastic surgery services is motivated by utilitarian and hedonist values. Aesthetic medicine and plastic surgery services may provide the right context for measuring the experience and emotional arousal of customers (patients). This view has been supported by Klaus (2018). In their literature review, Kuppelwieser and Klaus (2021)

confirmed that prior research focused on customer experience in various fields, especially in tourism and online services. One of the most commonly applied scales, Customer Experience Quality (EXQ) (Klaus, 2015; Klaus & Maklan, 2012, 2013), has been adapted for research on customer experience in various service contexts, for example, financial, tourism and sports services. Due to its universal character, the scale is becoming increasingly popular among researchers and practitioners (Lemon & Verhoef, 2016). In a holistic approach, the EXQ scale measures customer experience in all its stages, including direct and indirect interactions between the customer and other actors. For these reasons, we decided to apply this tool in Study 1.

TOOL: EMOTIONS IN CUSTOMER EXPERIENCE QUESTIONNAIRE

To meet the objectives of the study, we needed a tool that would capture cognitive and affective dimensions in a holistic customer experience. The cognitive dimension was measured using the EXQ scale developed by Klaus (2015). The affective dimension, in turn, was measured with supplementary items identifying emotions experienced before, during and after purchase/consumption. We decided to measure the basic emotions described by Ekman (e.g., Ekman & Cordaro, 2011; Ekman & Friesen, 1971; Ekman & Rosenberg, 2005), that is, happiness, surprise, anger, fear, disgust and sadness.

To measure a holistic customer experience, we used the EXQ scale developed by Klaus (2015) supplemented with additional items. This tool measures customer experience in three stages:

- Stage 1: Before purchase – perception of the reputation, brand and value offered by the service provider.
- Stage 2: During the experience – assessment of interactions associated with the purchase and the manner of service provision (in relation to service quality conceptualisation).
- Stage 3: After purchase/consumption – perception of the service as one that meets customer expectations (desired through the prism of customer experience).

EXQ measures a holistic customer experience using 25 items rated on a seven-point Likert scale (1 – strongly disagree; 7 – strongly agree). Similar to other researchers (e.g., Altinay et al., 2023; Hosany et al., 2021; Kuppelwieser & Klaus, 2021), we used a unipolar scale – a seven-point Likert scale – as such a tool accommodates a wider spread of responses, that is, values on either side of the midpoint (neutral value) as compared to a five-point scale (Tarka, 2017).

The original EXQ items were modified to fit the context of the study. For example, the word ‘company’ was replaced with ‘clinic’. Furthermore, driven by the belief that new statements can supplement and improve the existing customer experience scales (Li et al., 2025), we added two supplementary items to the scale. In the first stage of customer experience (before service consumption), we included the following statement: ‘CLINIC can be contacted in various ways (telephone, online, etc.)’, which pertains to online customer experience (e.g., Kacprzak & Hensel, 2023; Kuuru et al., 2020; Montemurro et al., 2015; Sharma et al., 2023), emphasising the role of communication in aesthetic medicine services (Ankiel et al., 2021; Liang et al., 2019). Based on a study by Dabaghi et al. (2022), we added the following item in the second customer experience stage (during service consumption), ‘The personnel demonstrated empathy and care towards the patient’, as good customer/patient–personnel relationships are emphasised in medical services. This is an important emotional component of customer experience in aesthetic medicine and plastic surgery services. Since customers trust someone with their health and appearance, they expect a special emotional connection that goes beyond a regular transactional relationship (e.g., Mróz, 2013).

Ultimately, the scale we used to measure a holistic customer experience in the cognitive dimension consisted of 27 items related to customer experience in aesthetic medicine and/or plastic surgery services.

To address the affective dimension, that is, the emotions accompanying customers in the process of experiencing a given service, we had to determine the range of emotions that would allow for capturing mixed emotional states in consumers. This required not only going beyond valence (positive versus negative emotions), but also measuring more than one discrete emotion experienced at the same time. Following a literature review aiming to identify the existing approaches towards capturing emotions as a component in customer experience measurement, we decided to focus on basic emotions in accordance with Ekman’s approach. Six universal emotions, that is, happiness, sadness, fear, surprise, disgust and anger (Ekman & Cordaro, 2011; Ekman & Friesen, 1971) were measured using a seven-point Likert scale (1 – never; 2 – very rarely; 3 – rarely; 4 – sometimes; 5 – often; 6 – very often; 7 – always). An approach like this is recommended by Wojciszke and Baryła (2004). It stems from the need to limit the number of items and ensure the comparability of data with those obtained from measurements performed with automated facial expression recognition tools.¹

The research tool used in Study 1 was prepared in the Polish language. Items from the EXQ scale by Klaus (2015) were translated and semantic problems were reduced and adapted to the services that provided the context for measurements. The questionnaire was consulted with researchers and market research practitioners. These consultations resulted in item content modifications,

particularly due to the linguistic context (Appendix 1). The changes and adaptations introduced allowed for the final testing of the Emotions in Customer Experience Questionnaire (EEX).

Before the actual data analysis, we assessed the structural reliability and accuracy of the scale. We used Cronbach's alpha to measure the former. When interpreting Cronbach's alpha, it is assumed that values of 0.70 or above indicate good or excellent internal consistency. As for accuracy assessment, we used exploratory factor analysis. We tried to assess the degree of empirical association between the conceptual elements. We assumed that despite measuring the experience before, during and after purchase/consumption, the expected result would be the measurement of one construct – holistic customer experience. Therefore, we considered the scale to be unidimensional.

The results of the exploratory factor analysis revealed a unidimensional structure of the scale (15.2354 – explained variance by factor 1; 1.3682 – explained variance by factor 2) (Tables 7.1a–7.1c).

Based on the analysis, we decided to exclude four out of the 27 items which did not reach the required value of 0.7 (13.7619 – total explained variance by factor 1; 1.1832 – total explained variance by factor 2) (Tables 7.2a–7.2c). Ultimately, 23 items were included in the EEX, which comprise the holistic customer experience in aesthetic medicine and plastic surgery services. Of these, seven pertain to the pre-service stage, ten to the service provision stage and six to the post-service stage.

Table 7.1a Results of exploratory factor analysis before the visit to the CLINIC including all items on the scale

Items	Factor 1	Factor 2
CLINIC has a good reputation	-0.7195	0.4091
CLINIC personnel have extensive expertise	-0.7512	0.3991
I can consult the staff about the treatment plan that will best suit my needs	-0.7311	0.3137
It is worth choosing CLINIC not because of the attractive price alone	-0.7195	0.2608
The personnel are high-calibre professionals who care about CLINIC's reputation	-0.8092	0.1585
CLINIC's services have the best quality	-0.7444	0.1919
CLINIC's offerings are superior	-0.7154	0.0792
CLINIC can be contacted in various ways (telephone, online, etc.)	-0.6539	0.2306

Table 7.1b Results of exploratory factor analysis during the visit to the CLINIC including all items on the scale

Items	Factor 1	Factor 2
The personnel advised me throughout the treatment process	-0.7982	0.0023
Dealing with CLINIC (going through the formalities) is easy	-0.7797	0.1546
The personnel always kept me informed	-0.7843	0.1392
The personnel demonstrated flexibility in addressing my needs	-0.7806	0.0066
The personnel demonstrated empathy and care towards the patient	-0.8013	0.0842
I always dealt with the same procedures and/or the same personnel	-0.5808	-0.1304
The personnel related to my wishes and concerns	-0.8166	-0.0658
The personnel communicated with me very well	-0.7979	0.0044
CLINIC delivered a good customer service	-0.7638	0.1124
I have built a good relationship with the personnel	-0.7674	-0.1302
CLINIC's infrastructure and facilities are better designed to fulfil my needs than their competitors	-0.6577	-0.3203
CLINIC's facilities are designed to be as accessible as possible	-0.7292	-0.2260

Table 7.1c Results of exploratory factor analysis after the visit to the CLINIC including all items on the scale

Items	Factor 1	Factor 2
I will choose CLINIC again because they know my treatment history	-0.8012	-0.1801
The personnel know exactly what I need	-0.7367	-0.3219
CLINIC keeps me up to date about their new offerings and latest developments	-0.5886	-0.3743
I will come back to CLINIC if need be	-0.7864	-0.2541
CLINIC dealt well with me, even when things went wrong	-0.7974	-0.2627
I am happy with my choice of CLINIC	-0.8715	-0.0666
My peers appreciate the CLINIC I chose	-0.7205	-0.2907

Table 7.2a *Results of exploratory factor analysis before the visit to the CLINIC excluding items not meeting the assumptions*

Items	Factor 1	Factor 2
CLINIC has a good reputation	-0.7241	0.4028
CLINIC personnel have extensive expertise	-0.7571	0.3899
I can consult the personnel about the treatment plan that will best suit my needs	-0.7388	0.3567
It is worth choosing CLINIC not because of the attractive price alone	-0.7231	0.2774
The personnel are high-calibre professionals who care about CLINIC's reputation	-0.8079	0.1928
CLINIC's services have the best quality	-0.7513	0.2334
CLINIC's offerings are superior	-0.7189	0.1282
<i>CLINIC can be contacted in various ways (telephone, online, etc.)</i>	<i>Statement excluded</i>	<i>Statement excluded</i>

Table 7.2b *Results of exploratory factor analysis during the visit to the CLINIC excluding items not meeting the assumptions*

Items	Factor 1	Factor 2
The personnel advised me throughout the treatment process	-0.7997	-0.0074
Dealing with CLINIC (going through the formalities) is easy	-0.7875	0.0967
The personnel always kept me informed	-0.7935	0.0709
The personnel demonstrated flexibility in addressing my needs	-0.7782	-0.0136
The personnel demonstrated empathy and care towards the patient	-0.8040	0.0271
<i>I always dealt with the same procedures and/or the same personnel</i>	<i>Statement excluded</i>	<i>Statement excluded</i>
The personnel related to my wishes and concerns	-0.8216	-0.0839
The personnel communicated with me very well	-0.8044	-0.0218
CLINIC delivered a good customer service	-0.7686	-0.0038
I have built a good relationship with the personnel	-0.7662	-0.1840
<i>CLINIC's infrastructure and facilities are better designed to fulfil my needs than their competitors</i>	<i>Statement excluded</i>	<i>Statement excluded</i>
CLINIC's facilities are designed to be as accessible as possible	-0.7174	-0.1510

Table 7.2c Results of exploratory factor analysis after the visit to the CLINIC excluding items not meeting the assumptions

Items	Factor 1	Factor 2
I will choose CLINIC again because they know my treatment history	−0.8005	−0.2619
The personnel know exactly what I need	−0.7336	−0.3495
<i>CLINIC keeps me up to date about their new offerings and latest developments</i>	<i>Statement excluded</i>	<i>Statement excluded</i>
I will come back to CLINIC if need be	−0.7843	−0.2878
CLINIC dealt well with me, even when things went wrong	−0.7979	−0.2765
I am happy with my choice of CLINIC	−0.8757	−0.1484
My peers appreciate CLINIC	−0.7129	−0.3247

We assessed the reliability of the 23 items on the scale. Total Cronbach's alpha was 0.9692; standardised alpha was 0.9693 and the average inter-item correlation was 0.5826 (Tables 7.3a–7.3c).

Table 7.3a Item reliability before the visit to the CLINIC stage of customer experience

Items: Before the visit to the CLINIC
CLINIC has a good reputation
CLINIC personnel have extensive expertise
I can consult the personnel about the treatment plan that will best suit my needs
It is worth choosing CLINIC not because of the attractive price alone
The personnel are high-calibre professionals who care about CLINIC's reputation
CLINIC's services have the best quality
CLINIC's offerings are superior
Reliability (Cronbach's alpha): 0.9128

Table 7.3b *Item reliability during the visit to the CLINIC stage of customer experience*

Items: During the visit to the CLINIC
The personnel advised me throughout the treatment process
Dealing with CLINIC/OFFICE (going through the formalities) is easy
The personnel always kept me informed
The personnel demonstrated flexibility in addressing my needs
The personnel demonstrated empathy and care towards the patient
The personnel related to my wishes and concerns
The personnel communicated with me very well
CLINIC delivered a good customer service
I have built a good relationship with the personnel
CLINIC’s facilities are designed to be as accessible as possible
Reliability (Cronbach’s alpha): 0.9402

Table 7.3c *Item reliability after the visit to the CLINIC stage of customer experience*

Items: After the visit to the CLINIC
I will choose CLINIC again because they know my treatment history
The personnel know exactly what I need
I will come back to CLINIC if need be
CLINIC dealt well with me, even when things went wrong
I am happy with my choice of CLINIC
My peers appreciate CLINIC
Reliability (Cronbach’s alpha): 0.9254

STUDY PROCEDURE AND RESPONDENT CHARACTERISTICS

The study used Computer-Assisted Web Interviewing. The EEX was programmed using CADAS software. Data were collected in a Syno Poland z o.o. online consumer panel. Participants invited to the study were adult Poles who had used aesthetic medicine and/or plastic surgery services in private clinics in the preceding 12 months. Management of the respondents’ participation

allowed for reducing the risk of panel conditioning which arises when the same respondents repeatedly take part in the same study. Furthermore, to avoid any ethical concerns, we enrolled only those individuals who were over the age of 18. Based on these enrolment conditions, we had to exclude 327 questionnaires. The reasons were as follows: (1) questionnaire abandonment; and (2) information obtained in the follow-up questions. We excluded questionnaires which met at least two of the following three conditions:

- too short response time, that is, interviews significantly deviating from the average (< 5 minutes);
- linearity of answers (e.g., all items rated as 7); and
- incompatibility of a given service (indicated by the respondent) with the category of aesthetic medicine and plastic surgery services (e.g., eyelash extensions).

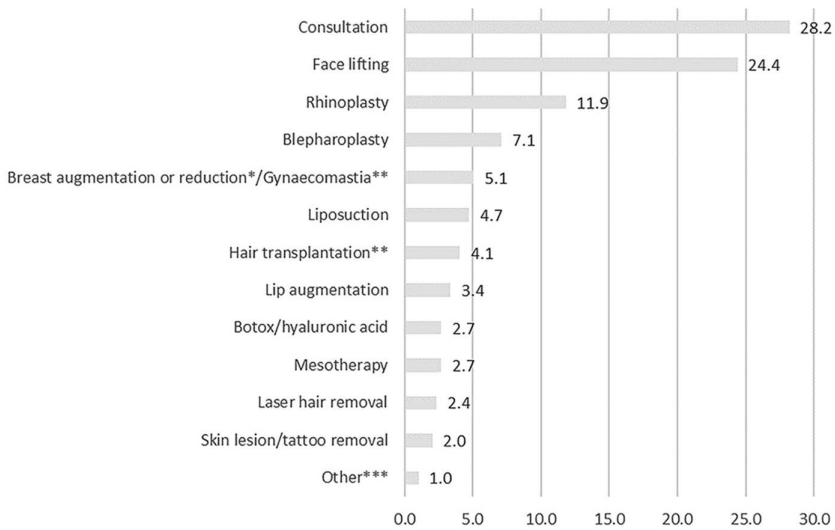
All respondents expressed consent to participate in the study. Ultimately, we obtained 294 correctly completed questionnaires. This sample size is regarded as sufficient (Clark & Watson, 1995). Of the 294 participants, the majority were female (71.1 per cent). The respondents were mostly aged 31–40 years (37.8 per cent) or 21–30 years (27.5 per cent) and had a higher education (57.5 per cent). The vast majority of respondents (81.3 per cent) were married or in a relationship. Most of them lived in large or very large cities (40.8 and 39.1 per cent, respectively) and described their financial standing as good (58.2 per cent) (Table 7.4).

The profile of a customer who uses aesthetic medicine and plastic surgery services described in this study is similar to that presented in industry reports (e.g., *Polacy o Medycynie Estetycznej – Czyli Jak Komunikować Zabiegi Do Pacjentów*, 2023; Tomaszewski, 2023).

Aesthetic medicine and plastic surgery services used by the respondents usually required a short stay in a private clinic. The majority of respondents spent less than 24 hours (60.9 per cent) or one day (22.8 per cent) in this type of facility. Some respondents spent considerably more time in a clinic, that is, 2–3 days (14.3 per cent) or 3 or more days (2 per cent). The services that constituted the basis for experience measurement included initial consultation appointments to present information about the aesthetic medicine or plastic surgery service planned (28.2 per cent), face lifting (24.4 per cent), rhinoplasty (11.9 per cent) and blepharoplasty (upper or lower lids) (7.1 per cent). Female respondents ($n = 13$) also mentioned breast augmentation or reduction, whereas males pointed to gynaecomastia surgery ($n = 2$) or hair transplant (4.1 per cent) (Figure 7.1).

Table 7.4 Socio-demographic profile of respondents (N = 294)

Categories	%	N
Gender: female	71.1	209
Gender: male	28.9	85
Age: 18–20 years	4.1	12
Age: 21–30 years	27.5	81
Age: 31–40 years	37.8	111
Age: 41–50 years	17.0	50
Age: 51–60 years	10.9	32
Age: > 60 years	2.7	8
Education: primary/vocational	4.4	13
Education: secondary	38.1	112
Education: higher	57.5	169
Marital status: married/in a relationship	81.3	239
Marital status: single	18.7	55
Place of residence: village	2.4	7
Place of residence: town (< 20,000 inhabitants)	5.8	17
Place of residence: mid-sized city (20,000–99,000 inhabitants)	11.9	35
Place of residence: large city (100,000–500,000 inhabitants)	40.8	120
Place of residence: very large city (> 500,000 inhabitants)	39.1	115
Subjective perception of financial standing: very poor	–	–
Subjective perception of financial standing: poor	5.4	16
Subjective perception of financial standing: hard to say	22.8	67
Subjective perception of financial standing: good	58.2	171
Subjective perception of financial standing: very good	13.6	40



Note: * Pertains to females, ** pertains to males, *** e.g., permanent make-up, laser therapy, otoplasty.

Figure 7.1 Aesthetic medicine and plastic surgery services used by respondents (%)

NOTE

1. For instance, FaceReader 8.1 software enables a real-time analysis of emotional reactions to various stimuli and recognition of basic emotions, including contempt and the neutral state (see Chapter 4).

8. Extending the customer experience scale to include emotions: empirical evidence

CUSTOMER EXPERIENCE IN AESTHETIC MEDICINE AND PLASTIC SURGERY SERVICES: COGNITIVE DIMENSION

The holistic customer experience in aesthetic medicine and plastic surgery services comprises three stages: before, during and after consumption. Compared to the other stages, the first seems to be the most important. The second and third stages received lower scores (Table 8.1). The high mean scores given by the respondents in the first stage may reflect their engagement in looking for the right products (services).

Analysis of individual items forming each of the stages provides an indication as to the potential touchpoints affecting the respondents' assessment and that were likely to trigger emotions. The human factor plays an important role in the pre-consumption stage of customer experience. The professionalism and competences of the staff are clearly appreciated ($M = 5.9694$). The way the offer is presented is also important. Respondents attached far greater importance to the emphasis on the quality ($M = 5.9626$) rather than the number and diversity of services ($M = 5.6871$).

Likewise, the customer experience during service provision is determined by the attitude of the personnel. Respondents appreciated various aspects of customer/patient communication. These included continuous updates ($M = 5.9014$), direct, empathetic personnel–customer communication ($M = 5.9149$) and efficient customer service ($M = 5.9218$). Respondents attached less weight to the facilities in the clinic ($M = 5.5884$).

In the post-consumption stage, respondents attached least importance to the acceptance of their choice by their peers (item: 'My peers appreciate CLINIC I chose' received the lowest score; $M = 5.5578$). In turn, self-satisfaction with the choice made received high scores (item: 'I am happy with my choice of CLINIC'; $M = 5.7925$). This not only confirms the hedonic nature of aesthetic medicine and plastic surgery services, but also indicates that they are a typical

example of credence services. This category encompasses offerings whose properties are difficult to evaluate, even after their purchase or consumption.

Table 8.1 Descriptive statistics for individual items on the scale

Items	Mean	Minimum	Maximum	Standard deviation
Before the visit to the CLINIC	5.8799	1.2857	7	1.0633
CLINIC has a good reputation	5.7279	1	7	1.4825
CLINIC personnel have extensive expertise	5.9694	1	7	1.3203
I can consult the personnel about the treatment plan that will best suit my needs	5.9184	1	7	1.3116
It is worth choosing CLINIC not because of the attractive price alone	5.9252	1	7	1.2643
The personnel are high-calibre professionals who care about CLINIC's reputation	5.9694	1	7	1.2782
CLINIC's services have the best quality	5.9626	1	7	1.2038
CLINIC's offerings are superior	5.6871	1	7	1.3079
During the visit to the CLINIC	5.7952	1.7	7	1.0598
The personnel advised me throughout the treatment process	5.7483	1	7	1.3159
Dealing with CLINIC (going through the formalities) is easy	5.7483	1	7	1.3916
The personnel always kept me informed	5.9014	1	7	1.2960
The personnel demonstrated flexibility in addressing my needs	5.7279	1	7	1.3196
The personnel demonstrated empathy and care towards the patient	5.8844	1	7	1.2959
The personnel related to my wishes and concerns	5.8299	1	7	1.2899
The personnel communicated with me very well	5.9149	1	7	1.2487
CLINIC delivered a good customer service	5.9218	1	7	1.3209
I have built a good relationship with the personnel	5.6871	1	7	1.3131

Items	Mean	Minimum	Maximum	Standard deviation
CLINIC's facilities are designed to be as accessible as possible	5.5884	1	7	1.3489
After the visit to the CLINIC	5.6905	1.1667	7	1.1771
I will choose CLINIC again because they know my treatment history	5.6769	1	7	1.4218
The personnel know exactly what I need	5.7279	1	7	1.3729
I will come back to CLINIC if need be	5.7551	1	7	1.3094
CLINIC dealt well with me, even when things went wrong	5.6327	1	7	1.3854
I am happy with my choice of CLINIC	5.7925	1	7	1.4644
My peers appreciate CLINIC I chose	5.5578	1	7	1.3148

EMOTIONS EXPERIENCED BY CUSTOMERS OF AESTHETIC MEDICINE AND PLASTIC SURGERY SERVICES

In Study 1, we decided to measure emotions accompanying customers throughout their holistic experience of aesthetic medicine and plastic surgery services, using self-report and retrospective questionnaire-based measures. We focused on measuring the basic emotions (happiness, sadness, anger, fear, disgust and surprise) described by Ekman (Ekman & Cordaro, 2011; Ekman & Friesen, 1971). We determined whether respondents experienced these emotions and, if so, with what intensity. Importantly, focusing on basic emotions allowed us to capture a variety of emotions with a different valence, which is rarely achieved in attempts to operationalise emotions in customer experience. Each of the emotions was rated on a seven-point Likert scale reflecting their intensity in three stages of customer experience in aesthetic medicine and plastic surgery services (before, during and after consumption).

The basic descriptive statistics for each emotion are presented in Table 8.2. During the holistic customer experience in aesthetic medicine and plastic surgery services, the respondents experienced various emotions (both positive and negative) of differing intensity. The rarest emotion in the mix was disgust. The experience of positive emotions was clearly predominant (happiness). Happiness was accompanied by surprise, an emotion experienced on the occasion of rare events, which is consistent with the character of the service studied.

However, accurate identification of surprise is difficult, as the emotion may be confused with fear. Fear and surprise together represent negative emotions. The results have confirmed that it is justifiable to focus on different emotions

Table 8.2 Emotions experienced throughout the holistic customer experience

Emotion	Mean	Minimum	Maximum	Standard deviation
Before the visit to the CLINIC: happiness	5.3877	1	7	1.2823
Before the visit to the CLINIC: sadness	2.4659	1	7	1.5447
Before the visit to the CLINIC: anger	2.1871	1	7	1.5727
Before the visit to the CLINIC: surprise	3.8367	1	7	1.4850
Before the visit to the CLINIC: fear	3.4285	1	7	1.6749
Before the visit to the CLINIC: disgust	2.0408	1	7	1.4774
During the visit to the CLINIC: happiness	5.4116	1	7	1.2815
During the visit to the CLINIC: sadness	2.4149	1	7	1.6330
During the visit to the CLINIC: anger	2.0510	1	7	1.4919
During the visit to the CLINIC: surprise	3.5782	1	7	1.6145
During the visit to the CLINIC: fear	2.9932	1	7	1.6810
During the visit to the CLINIC: disgust	1.9524	1	7	1.4562
After the visit to the CLINIC: happiness	5.5612	1	7	1.3250
After the visit to the CLINIC: sadness	2.1429	1	7	1.5257
After the visit to the CLINIC: anger	2.0170	1	7	1.5334
After the visit to the CLINIC: surprise	3.3639	1	7	1.7604
After the visit to the CLINIC: fear	2.4218	1	7	1.5953
After the visit to the CLINIC: disgust	1.9252	1	7	1.4338

when measuring a holistic customer experience. They revealed the predominant trend in the emotions felt by the respondents throughout their customer experience. Happiness was the most frequently experienced emotion, which

may stem from the retrospective nature of the measurement and satisfaction with the experience itself. Happiness combined with surprise, and in the first stage with fear, may be a consequence of choosing a particular service. On the one hand, the nature of aesthetic medicine and plastic surgery services enabled respondents to experience emotions directly associated with the very purpose of the service (e.g., happiness related to the anticipation of the service or experienced after service provision; or fear of the procedure). On the other hand, the emotions experienced may be associated with the very process of service provision (e.g., surprise stemming from the procedure experienced or fear of this procedure). It should also be emphasised that the results obtained are a direct consequence of our choice of emotions on the basis of which the respondents assessed their affective states. Despite our deliberate decision to choose Ekman's six basic emotions (Ekman & Cordaro, 2011; Ekman & Friesen, 1971), the range of emotions experienced by customers may be wider and closely associated with the nature of a given service (e.g., embarrassment, shame). Therefore, it would be valid to extend the list of emotions potentially experienced by a customer in accordance with the nature of a particular service.

EMOTIONS IN DIFFERENT STAGES OF CUSTOMER EXPERIENCE

In order to determine whether retrospective measurement allows for capturing differences in declarations related to the emotions experienced by the respondents, we compared the intensity of individual emotions experienced before, during and after an aesthetic medicine and plastic surgery procedure (Figures 8.1–8.6).

To verify the significance of differences, we compared emotions experienced before and after the procedure. We observed significant differences in terms of experiencing fear ($p < 0.0001$), surprise ($p = 0.0005$) and sadness ($p = 0.0109$). The intensity of fear and sadness experienced by the respondents before the procedure was greater than that after the procedure, which stems from the nature of the service. We carried out a similar comparison to test for statistical significance of differences before and during service provision. In this case, we observed a statistically significant difference between surprise ($p = 0.0438$) and fear ($p = 0.0017$). We also compared the emotions experienced by the respondents during and after service provision. Here, we found a difference between fear ($p < 0.0001$) and sadness ($p = 0.0373$).

Our findings confirm that respondents can retrospectively describe the emotions they felt and differentiate them, especially in the case of sadness and fear, which often emerge in relation to medical procedures or the associated pain. What is surprising, though, is the high intensity of happiness and joy experienced in all stages of customer experience. This may stem from the hedonic

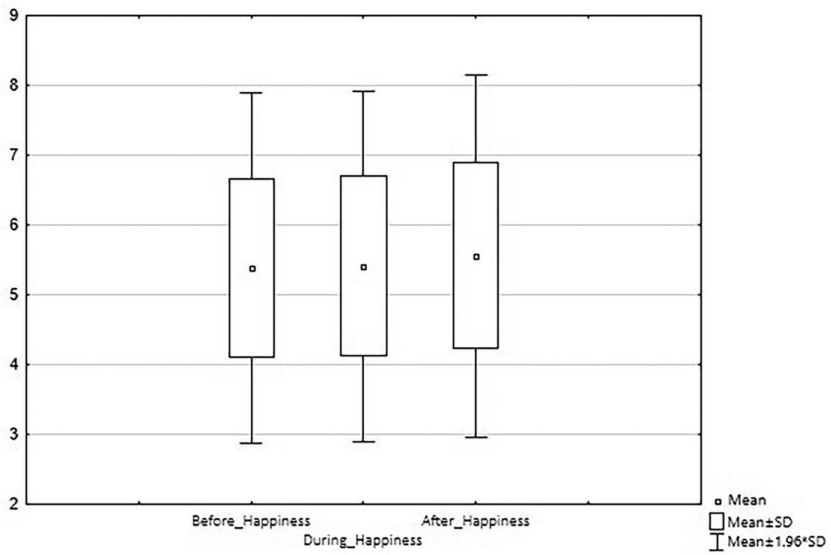


Figure 8.1 Happiness experienced by respondents throughout the holistic experience before, during and after consumption

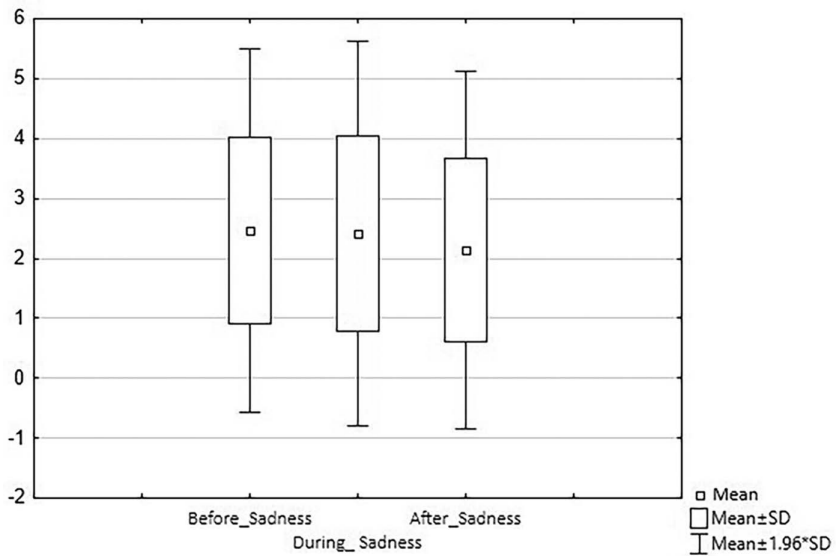


Figure 8.2 Sadness experienced by respondents throughout the holistic experience before, during and after consumption

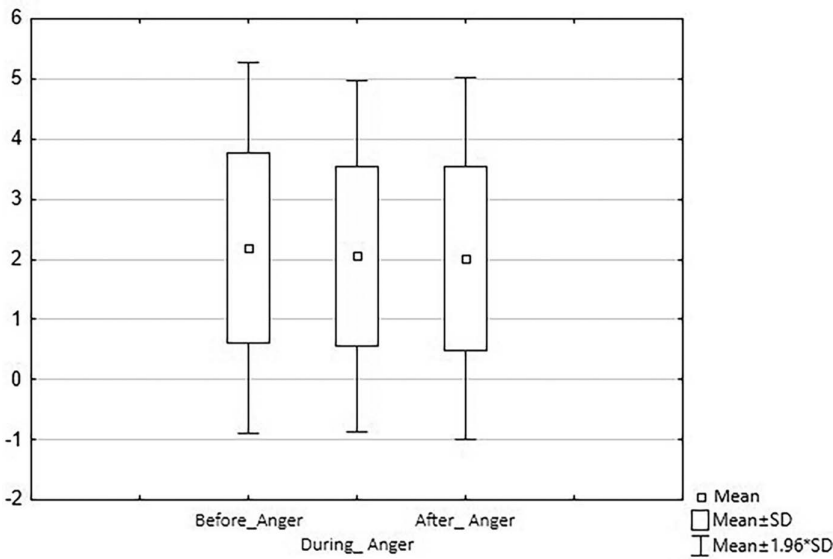


Figure 8.3 Anger experienced by respondents throughout the holistic experience before, during and after consumption

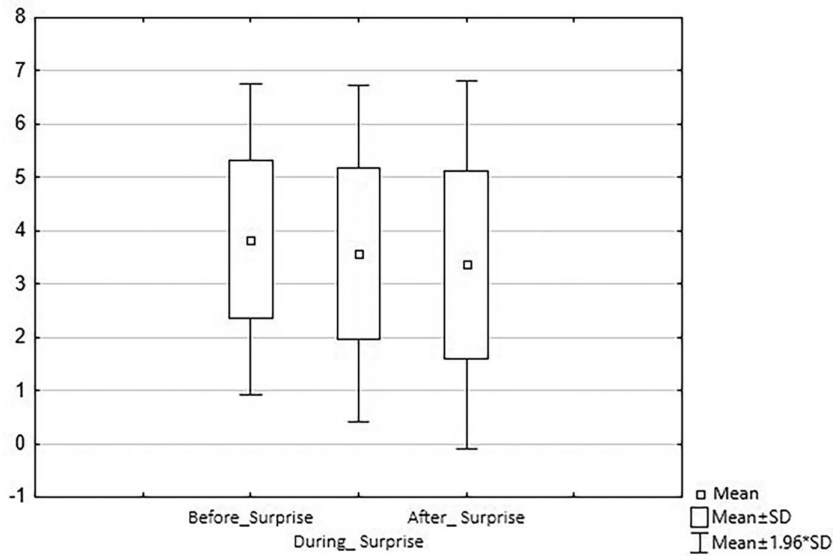


Figure 8.4 Surprise experienced by respondents throughout the holistic experience before, during and after consumption

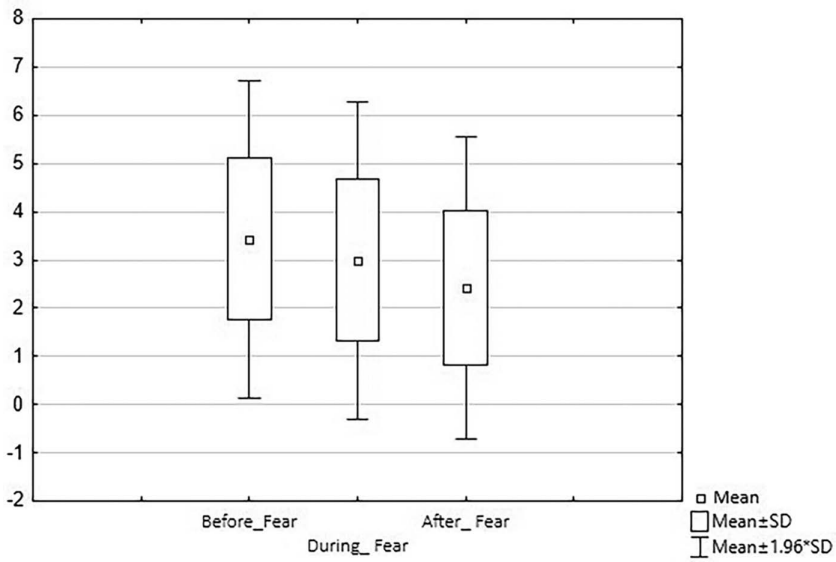


Figure 8.5 Fear experienced by respondents throughout the holistic experience before, during and after consumption

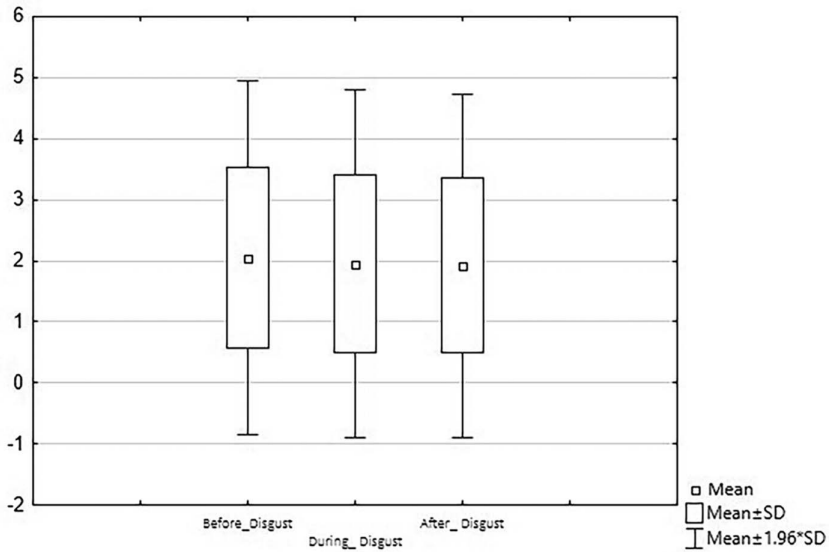


Figure 8.6 Disgust experienced by respondents throughout the holistic experience before, during and after consumption

nature of the service chosen as well as from the type of procedure used by the respondents. This is why we verified whether the experience of happiness in the three stages of customer experience is associated with the length of stay in a clinic (Figure 8.7).

After the procedure, respondents experienced happiness to a similar extent, irrespective of the length of stay. In contrast, we found differences in the degree of happiness experienced during ($p = 0.0390$) and before ($p = 0.0539$) service provision. Respondents who spent one day in the facility experienced this emotion least frequently. It is worth emphasising that respondents who underwent procedures that did not require a 24-hour stay in the facility were most unanimous in their scores. In turn, score deviation was the highest in the case of those respondents who spent three or more days in the facility. These data indicate that scoring is associated with a particular type of aesthetic/medical service used by the respondents.

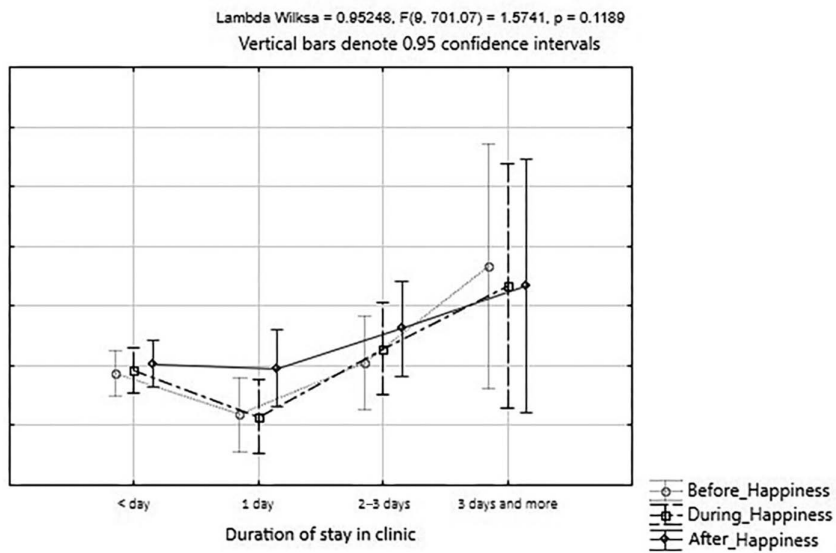


Figure 8.7 *Happiness experienced by respondents throughout the holistic experience before, during and after consumption depending on the length of stay*

9. Measuring customer emotions in a holistic experience through self-reporting: theoretical issues and practical recommendations

The conceptualisation and measurement of customer experience are issues that have been debated in the marketing and consumer behaviour literature (Kuppelwieser & Klaus, 2021; Lemon & Verhoef, 2016). Indeed, customer experience is a difficult concept to grasp. Even more so when it comes to emotions. Both theoretical and empirical studies suggest that emotions are a key determinant of the perception and evaluation of customer experience, especially regarding service experience (Brady & Cronin, 2001; Guo et al., 2024). Thus, it is important to measure a holistic customer experience, including all stages of the customer journey and its cognitive and emotional components. Consequently, the complex nature of experiences could be captured, allowing a better understanding of the customer. However, an approach like this has yet to be developed.

Therefore, an urgent question emerges: ‘How to measure customer experience taking into account its emotional dimension?’. Future theoretical and empirical work is needed to advance our understanding of the role of emotions in customer experience. Theoretical work is necessary to clearly define the construct of customer experience and emotions in customer experience. Empirical work, in turn, is needed to determine how and at what stage to measure emotions, especially with regard to complex and often context-oriented consumer journeys. Given that the knowledge about customer experience and emotions is largely derived from studies employing self-report measures (Becker & Jaakkola, 2020), it seems natural to consider this approach (Caruelle et al., 2019) and develop scales that would allow for capturing emotions in customer experience. However, this is not an easy task, especially in light of the limitations of subjective measures.

In line with this discussion, based on our proof-of-concept research into holistic experiences of customers using aesthetic medicine and plastic surgery services, we tested a specific solution enabling emotion measurement in

three stages of the experience. The results formed the basis for a discussion of methodological issues, offering guidelines on the development of verbal self-reporting scales measuring customer emotions. Furthermore, they allowed the development of practical guidance on how to plan the measurement.

THEORETICAL ISSUES: HOW TO FURTHER DEVELOP MEASUREMENT SCALES TO CAPTURE EMOTIONS IN CUSTOMER EXPERIENCE

Contributing to the discussion on emotion measurement in customer experience, based on our proof-of-concept research into holistic experiences of customers using aesthetic medicine and plastic surgery services, we offer several suggestions that would help to partially answer the following question:

- What dilemmas do researchers face when measuring mixed emotional states in customer experience research via self-report measures?

These suggestions pertain to three major areas, namely, defining (conceptualising), measuring and interpreting emotions in customer experience.

A correct conceptualisation of the main constructs or variables is important in any research study. The same applies to studies exploring customer experience. Both customer experience and emotions are complex notions, whose different definitions warrant emphasising different aspects during measurement. This requires a decision on how to define the two interrelated umbrella terms 'customer experience' and 'emotion' as an *action object*. When making this decision, it is also necessary to synthesise various approaches to these constructs. All the more so since the literature on each of them is scattered among various streams of research. For example, emotions in the service context require a review of service management, organisational psychology and social psychology literature (Delcourt, 2024; Prayag, 2022).

In our proof-of-concept research, the holistic customer experience was analysed in a specific context of aesthetic medicine and plastic surgery services, which may be regarded as a high-contact, high-involvement and high-emotional service setting (Danaher et al., 2023; Godovykh & Pizam, 2023; Klaus, 2018). At the conceptualisation and operationalisation stage, in accordance with the definition of customer experience as the 'evolvment of a person's sensorial, affective, cognitive, relational, and behavioural responses to a firm or brand by living through a journey of touchpoints along pre-purchase, purchase, and post-purchase phases' (Homburg et al., 2017, p. 384), we had to establish what touchpoints occur during the customer journey and, consequently, what would form the basis for interpreting emotions revealed in self-report measures. Touchpoints are usually defined as a decomposed series

of interactions between a company, brand, employee and customer (Kim & So, 2024). In other words, these are ‘any verbal or nonverbal incident[s] a consumer perceives and consciously relates to a given firm or brand’ (Homburg et al., 2017, p. 384). Although for the purpose of systematising and compiling knowledge in the field of customer experience it would be advisable to look for universal touchpoints, these are firmly embedded in the context of the service or product being analysed. The case of aesthetic medicine and plastic surgery services selected for our study combines interactions between: the customer/patient and a company (customer-to-organisation interaction such as contact with a company, advertising, facilities in the clinic); the customer/patient and other customers/patients (customer-to-customer interaction, e.g., electronic word of mouth as a way of sharing information and emotions related to previous experiences with the service/clinic); and the customer/patient and personnel (customer-to-employee interaction). The latter type of interaction is of key importance, especially in clinical healthcare (Danaher et al., 2023). It pertains to the direct and indirect customer/patient interactions with the personnel involved in various stages of the service provided (e.g., physician, front-desk employees) (Kim & So, 2024). It also allows for effective interpersonal communication in service settings (Danaher et al., 2023), which is central to high-quality healthcare.

Consideration of these specific requirements determined our choice of the research tool. The Customer Experience Quality scale developed by Klaus (2015) measures experience from the perspective of an individual customer. It measures a holistic customer experience in all its stages, including direct and indirect interactions between the customer and other actors (e.g., personnel). However, its initial version does not capture customer emotions. Thus, its application required not only adaptation and embedding in the context of a specific service category, but also a decision on the type of customer emotions measured. In this study, we decided to measure Ekman’s six basic emotions: happiness, sadness, anger, fear, disgust and surprise (Ekman & Cordaro, 2011; Ekman & Friesen, 1971). To ensure the scale’s consistency, they were measured using a verbal self-report questionnaire.

The solutions we adopted confirm the validity of the discussion on the type of emotions that should be included in the measurement of experiences associated with the consumption of specific services. The tool, which we adapted and completed, allowed us to measure mixed emotions both throughout the experience and in its individual stages. However, it also revealed several issues. First, it is important to discuss the context-related emotions included in customer experience research. The use of Ekman’s six basic emotions allowed us to confirm that customers/patients experience mixed emotions in each stage and that these emotions change as the customer moves from one stage to another. However, our study showed that this approach, despite its

universal character, does not fully reflect the diversity of emotions experienced by customers/patients. Thus, further development of self-report scales should focus on establishing a list of emotions specific to a particular service, associated with service settings and high–low contact and high–low involvement in the consumption process. Moreover, it seems reasonable that customer emotion researchers should use psychological measures as the basis for developing their own marketing-specific concepts and categorisations of emotions.

Second, the retrospective measurement of mixed emotions used in our study pertains to the subjective component of emotions (Desmet, 2018; Li et al., 2015; Poels & Dewitte, 2006). As such, it does not allow for making inferences about the associations between specific stimuli and responses. It is based on the ability of the respondent to recall emotions experienced at a specific moment in time. This means that, on the one hand, the development of self-report scales has to include a list of discrete emotions specific to particular service settings but, on the other hand, it enables the measurement of conscious emotions only.

This leads to another area of dilemmas faced by researchers measuring mixed emotions in customer experience using self-report methods, namely, the measurement itself. Despite the fact that self-report measures are easy to use and popular in emotion research (Hosany et al., 2021), they have their limitations. The limitations of scales used in verbal self-report studies prevent capturing the unconscious, affective components of experience or their temporal changes. Naturally, changes in mixed emotions can be observed over the study duration if the scales are designed to measure experience at, for example, three moments in time. However, the *ex post* measurement employed in our study indicated only the general predominant emotional strategy in customer experience, including emotions predominant in each stage, but did not allow for identifying emotions experienced by respondents in relation to the touchpoints or their components.

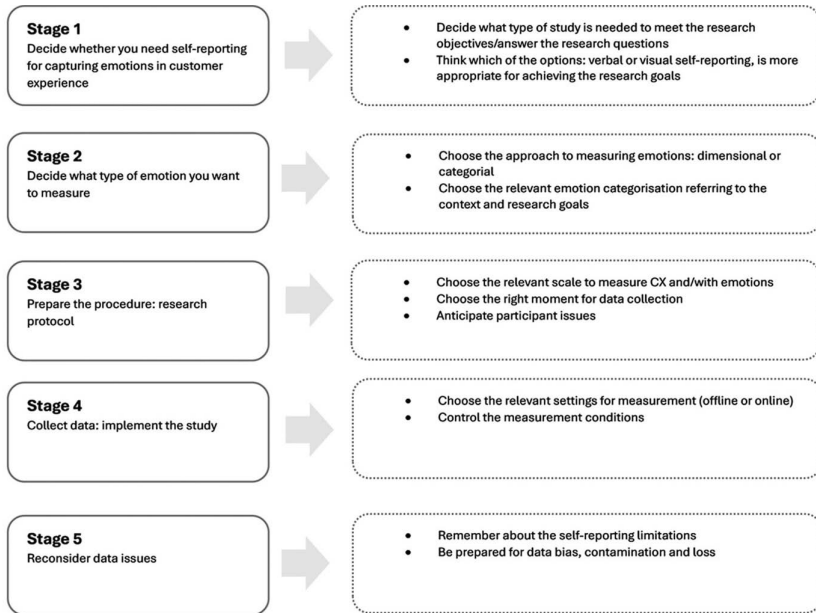
Scale design also involves choosing not only the type, but also the number of emotions to be included in the tool. In our proof-of-concept research, we had to discard a number of questionnaires due to assessment bias, which indicates that the length of a verbal self-report questionnaire is important. Apart from the 27 items measuring the cognitive component of experience, the tool we used in our study also included 18 items pertaining to the six basic emotions, repeated in each of the three stages. Although the questionnaire took less than 10 minutes to complete, the cognitive effort to recall relevant memories was considerable. This may be due to several reasons. For instance, respondents may have found it difficult to verbalise the emotions they felt or may have been reluctant to revisit the unpleasant or traumatic experiences. It also needs to be stressed that respondents rated a specific list of emotions. On the one hand, this made it possible to determine whether these emotions occurred and, if so,

with what intensity. On the other hand, we assumed that respondents properly recognised and named the emotional states they experienced.

Another group of issues concerns results interpretation. In addition to the above-mentioned limitations associated with measuring the subjective components of emotions, that is, conscious, memorised emotions, which is characteristic of all verbal self-report measures, the scale used in our study emphasises a specific service setting, that is, touchpoints focusing on interactions with employees. As suggested by Kim and So (2024), employees are an important touchpoint for consumers during the customer journey in a service setting. Nevertheless, not every service setting is comparable in terms of the contact level and involvement level. When interpreting study results, it is important to have a baseline that would allow for interpreting the intensity of emotions felt in each stage of the experience. For example, experiencing fear when using aesthetic medicine and plastic surgery services seems natural. In the case of this and other types of high-contact, high-involvement, emotional service settings (Danaher et al., 2023), customers/patients have less knowledge of the process and potential outcomes, hence they may feel anxious. They may feel overwhelmed by the lack of control over the performance of the service or by medical terms appearing in communication with physicians, which is associated with information asymmetry in the patient–doctor interaction (Danaher et al., 2023), especially in the case of a ‘traumatic journey’ (Berry et al., 2015). Thus, a question arises as to what level of emotion intensity is considered to be expected versus too high, as the latter could motivate change in customer-to-employee interactions.

PRACTICAL RECOMMENDATIONS: RESEARCH AGENDA

The compilation of suggestions derived from the literature and our proof-of-concept research allowed us to formulate a set of practical recommendations relating to the basic stages of designing and implementing customer experience research, taking into account its affective dimension. These were grouped into five major stages essential to conduct a successful study (Figure 9.1). Stages 1 and 2 pertain to the research subject or action object, that is, the answer to the question ‘What to study?’. Stage 3 refers to research protocol preparation, Stage 4 to data collection and Stage 5 to data analysis and interpretation. The recommendations do not include guidelines that are typical of every questionnaire-based measurement.



Note: CX = customer experience.

Figure 9.1 Stages of designing and implementing a self-report study of emotions in customer experience

Stage 1: Decide Whether You Need Self-reporting for Capturing Emotions in Customer Experience

The literature has increasingly emphasised the need to measure customer emotions, as they are considered one of the main components of consumption experience (Hirschman & Holbrook, 1982). However, in order to decide on the measurement method, researchers first have to be aware of the purpose of measuring emotions in a given research project. Emotions are multifaceted phenomena (Caruelle et al., 2024; Gaur et al., 2014; Mauss & Robinson, 2009). They consist not only of a subjective component that can be analysed using self-report measures, but also of physiological reactions or specific behaviours (Mauss & Robinson, 2009). The focus on measuring the subjective experiences of customers will not always allow for achieving the research objectives. Our review of methods for measuring customer emotions reveals numerous possible ways to study the various components of emotions. Given their limitations, self-report measures do not provide answers to detailed questions about the variety of emotions elicited by specific touchpoints or their components.

However, these measures allow respondents to control how they reveal emotions during the measurement, which is important in cases when they want to hide the emotions they experience. In situations like these, it will be more apt to use physiological and neuroscience methods, as they can capture unconscious, automated processes.

If the goals of the project and the formulated research questions require using self-report methods to measure emotions, the next decision facing the researcher concerns the type of self-report measures to be employed. This group consists of a variety of techniques that allow the qualitative or quantitative measurement of variables (Desmet, 2018; Li et al., 2015; Poels & Dewitte, 2006). However, most commonly, researchers decide between verbal self-report and visual self-report measures. Each of these solutions has its pros and cons (see Chapter 2). The analysis of these advantages and disadvantages, especially with regard to the objectives of the study, should form the basis for employing self-reporting to measure emotions in a customer experience research project.

Stage 2: Decide What Type of Emotion You Want to Measure

Our proof-of-concept research confirmed that during the holistic experience customers felt various emotions, whose type may be associated with a given service. This fact, however, does not determine which approach to measuring emotions is relevant in a particular project. Researchers typically use one of the following two solutions: dimensional or categorial (Caruelle et al., 2024; Ekman, 2016; Kujur & Singh, 2018). In the first case, they predominantly focus on valence, and in the other on discrete emotions. This latter approach requires making a concrete decision about the type and number of emotions to be measured. There are two different approaches that can be adopted here. The researcher can use one of the categorisations of emotions rooted in psychology. However, this may be associated with a discrepancy between the emotions studied and customer experience settings, as was the case in our proof-of-concept research pertaining to aesthetic medicine and plastic surgery services. The choice of basic emotions proved to be incomplete. Another solution is to develop or use an existing list of emotions characteristic of a specific product, service or brand. For this purpose, it is worth conducting preliminary research to determine the predominant emotions accompanying respondents, without necessarily starting from deductive theories (e.g., those concerning basic emotions).

Stage 3: Prepare the Procedure: Research Protocol

A correct conceptualisation of emotions should not be detached from the conceptualisation of customer experience. Thus, the measurement requires

choosing a specific tool for measuring customer experience and the associated emotions. This, in turn, necessitates a review of scales and their psychometric properties (reliability and accuracy), bearing in mind service or product settings. Furthermore, a holistic approach to customer experience should include three stages, which is not necessarily the case with the available retrospective post-experience (*ex post*) solutions.

This is associated with yet another problem, namely, the time in which the measurement is performed. Self-report measures can be used before the experience (e.g., when the goal is to explore a long-term relationship with a service provider/brand (Calvo-Porrall & Lévy-Mangin, 2020), during the experience (employing moment-to-moment rating, which is difficult to apply in customer experience research) (Poels & Dewitte, 2006) and after the experience). This last approach is most commonly used by researchers (Becker & Jaakkola, 2020) and was also employed in our proof-of-concept research. In order to test the Emotions in Customer Experience Questionnaire scale, we invited respondents who had used aesthetic medicine and/or plastic surgery services in private clinics/offices in the preceding 12 months. This was due to the specific nature of the service, which was the action object in our study. In this case, it is difficult to unequivocally determine the moment of 'post-consumption', as the final outcomes associated with the use of the service and the discomfort experienced sometimes last up to several months after the second stage. However, this does not apply to all services, brands or companies. In an attempt to reconcile the suggestions for the highest reliability of the moment-to-moment reporting of emotions (Mauss & Robinson, 2009; Robinson & Clore, 2002) and the specific character of a given experience, it seems reasonable to shorten this time. This has implications for the basic principles of sampling. Respondents should not only be customers of a particular company, brand or service/product, but their interaction or consumption experience should be easy to elicit. Arguments for the shortest possible time between the experience and its measurement stem from several biases. Relying on recollections can cause suppression and rationalisation of emotions, hence distorting the study results. The reliability of interpretations regarding the intensity of emotions may also be questionable. However, with services 'stretched over time', studying the holistic customer experience requires a longer time frame. This stems from the unique character of the service or product settings. These are not the only issues that need to be considered when anticipating respondent-related problems. For instance, respondents participating in questionnaire-based measurements are often selected based solely on filtering questions (e.g., form panels). Researchers are not always sure of the respondents' motivations to participate in the study and their involvement in the research process. This requires additional follow-up questions and solutions to measure attentiveness. It might happen that respondents misunderstand the research subject or action object. For example, in our study, some respondents incorrectly assigned specific services to a broader

category of aesthetic medicine and plastic surgery services, which led to the exclusion of some of the data.

Stage 4: Collect Data: Implement the Study

Data collection is a consequence of the previous decisions about the time and setting (offline or online) in which the data will be obtained. This decision should be motivated by both the researcher's expectations (e.g., fast and inexpensive data collection) and the possibility of ensuring comfortable measurement conditions for respondents (e.g., anonymity and security regarding the disclosure of sensitive data). Each of these solutions requires different preparation on the part of the researcher, especially when it comes to distributing the tool among respondents. As regards offline measurement, the researcher has greater control over the study. However, this setting may be burdened with social desirability bias. In turn, online measurement reduces the researcher's control and, at the same time, increases the likelihood that the respondent will not complete the measurement. Additionally, it requires an application/software for the digitisation of the tool. When measuring emotions in the three stages of consumer experience, it is worth ensuring that the solution chosen does not allow respondents to return to the questions they had already answered. This helps to avoid linearity and forces the respondent to become more involved in completing the questionnaire.

It is also important to undertake pilot studies. Irrespective of the decision about the set of measurement tools to be employed, the adaptation of scales to a specific context requires reliability testing.

Stage 5: Reconsider Data Issues

Every dataset, regardless of the type of project, requires data verification and cleaning. The same applies to self-report methods for measuring emotions in customer experience. The solutions ensuring the methodological rigour of the study (e.g., questions measuring attentiveness, screening questions) necessitate verification of the dataset and rejecting data that do not meet the requirements.

Lastly, researchers have to face challenges associated with data interpretation. Naturally, there are numerous reasons for making generalisations (e.g., sample size, sampling process). It is important to remember that the questionnaire-based measurement pertains only to the subjective component of emotions, which is always a partial reflection of the affective states experienced by respondents. Furthermore, these are general experiences. Thus, they limit the possibility of making recommendations on detailed aspects of customer experience design and management.

PART IV

Recognising emotions in a holistic customer experience: consumer neuroscience approach

Introduction to Part IV

In contrast to self-report measurement, which is subject to distortions arising from subjective evaluations and omissions of unconscious emotional reactions (Landmann, 2023), neuroscience-based approaches to measuring emotions use physiological technologies rooted in consumer neuroscience. Part IV presents the possibility of using neurophysiological techniques to measure the emotional states of customers during service provision. It illustrates the potential for measuring mixed emotional states in customer experience with the use of facial recognition software. The application of this group of tools requires a rigorous experimental procedure focusing on a particular type of stimulus tested with an appropriate tool. During the operationalisation process, we adopted similar assumptions regarding the service tested in Study 1. We tried to select a hedonic service that would allow for capturing the different emotional states of a consumer. Ultimately, we decided to analyse customer experience in health tourism. A study by Elbaz et al. (2023) indicates that the experience of a health tourist comprises both negative and positive emotions. The former are, for example, indignation, disappointment, irritation and fear, whereas the latter include delight, captivation, excitement and pleasure. Consequently, health tourism experience, more than other types and forms of tourism experiences, has to be analysed through the prism of emodiversity (Wang et al., 2021).

The identification of emotions in the experience of customers, in this case health tourists, poses a research challenge, especially when using neurophysiological measures. The subject literature emphasises the role of factors that may enhance/diminish the emotional reactions of customers and lead to psychological states and behaviours observed in real time (e.g., determinants related to accommodation service environment as components of the health tourism product) (Brunner-Sperdin et al., 2012). Thus, it is of key importance to analyse the experience of health tourists in real time. To date, few studies in the field of health tourism have used tools for real-time facial expression analysis (FaceReader) and the identification of customer emotions. In this proof-of-concept study, we decided to present the possibilities of using facial expression recognition software to measure emotions in customer experience. In our

original study (Study 2), consumer emotions were measured as they emerged in situ at specific touchpoints related to the people, service and environment studied. FaceReader version 8.1 was used to recognise facial expressions. The results accentuate the emotion mix in customer experience and changes in emotional arousal.

10. Exploring customer experience in real time: a case study of spa service consumers (health tourists)

Health tourism (defined as a coherence of spa and tourism services offered in the form of a product) may provide a suitable ground for determining the role of emotions in the experience of spa enterprise customers. At the same time, it poses a challenge, as it is believed that healthcare services are associated with high levels of emotions and intense feelings that occur even before the treatment stage (Berry et al., 2015). This type of service, including spa treatment, may trigger negative psychological states in patients (especially in older people), for example, dissatisfaction, helplessness, hopelessness and loneliness (Engström et al., 2022), and persistent pain and suffering (Cvetkova & Smith, 2024). Patients, women in particular, require interest and emotional support from the staff (Engström et al., 2022). Studies have shown (e.g., Loureiro, 2017; Pinos Navarrete & Shaw, 2021) that all the elements of a health tourism destination, for example, servicescape, or hospital reliability, comprise (internal and external) stimuli playing a role in customer experience. The very tourism (including tourist activity), especially its health-related types and forms (e.g., UNWTO, 2018), is usually associated with something pleasant that evokes positive emotions.

Spa resorts offer a wide range of services, such as destination product, where the therapeutic product is extended to include medical and wellness services (Dryglas & Smith, 2024). However, it is still unclear what real-time emotions are of key importance in the experience of spa enterprise customers (the segment of health tourists). Spa resorts exemplify health tourism destinations, where it is possible to measure both the positive (Suban, 2024) and negative emotions of spa enterprise customers, that is, health tourists defined as spa resort visitors staying at a spa hospital temporarily (up to 21 days).

For the purpose of this study, we selected two leading spa hospitals with a similar offer. The only difference between them was the location. One was located in Sopot on the Polish coast (Spa hospital A) and the other in Ciechocinek in the Polish lowlands (Spa hospital B). Sopot and Ciechocinek are among the most popular spa destinations in Poland. The status/brand of

these destinations (Kozarkiewicz & Kabalska, 2018), their image (Suban, 2024) as well as the city brand experience (Florek & Insch, 2020), including the emotional attachment to a spa brand (e.g., Alnawas & Hemsley-Brown, 2018), may evoke particular emotions. However, this aspect has not been included in our study. Following the principles of free-market health services, spa (therapeutic) enterprises offer a competitive and increasingly sustainable therapeutic product (Szromek et al., 2023). Sopot is one of the leading cities in Poland in terms of commitment to the environment. This is conducive to taking up physical activity in an open space characterised by a marine climate (presence of iodine and health-promoting essential oils from the surrounding coniferous forests). Undoubtedly, the climatic factors, together with other natural medicinal resources, that is, therapeutic waters, brine and peat, are beneficial to the health of local inhabitants and domestic and foreign health tourists. In turn, Ciechocinek boasts not only great popularity, as evidenced by one of the highest numbers of visitors, but also the oldest and largest brine thorn house in Poland and Europe. These spa resorts are an example of the innovative approach adopted by spa enterprise managers, which is mainly based on treatment evidence, health services and natural resources, thus improving customer experience (Smith et al., 2016).

FACEREADER SOFTWARE FOR EMOTION MEASUREMENT

In our analysis of facial expressions, we used the automated facial action coding system FaceReader 8.1 (see Ferreira et al., 2021; Skiendziel et al., 2019). This software detects facial expressions to determine the frequency and intensity of emotions. It allows for facial expression recognition offline and online. Video footage, images (pictures) or direct camera recordings of interviews are used for this purpose (Loijens & Krips, 2019).

During the research procedure, we followed the experimental study protocol involving the use of FaceReader software (Landmann, 2023). To analyse the variables, we used the anatomical face model 'Elderly', adjusted for studying elderly participants aged 60 and over. We applied continuous tool calibration at 30 frames per second. The 8.1 version of the software offers estimated heart rate graphs generated by algorithms analysing the main arteries around the face (Remote Photoplethysmography Module) (Den Uyl & Van Kuilenburg, 2005).

The analysis was performed using the audio-visual material collected. The recordings were divided into time segments related to five photographs representing different touchpoints that shape customer experience (Table 10.1).

During the interview, participants were presented with photographs from the official website of a given spa resort, displayed on a laptop (Spa hospital

Table 10.1 Touchpoints in the experience of spa enterprise customers

Touchpoints (T)	Author(s)
T1: Nature-controlled touchpoints	Dabaghi et al. (2022), Elbaz et al. (2023), Huijbens (2017), Penagos-Londoño et al. (2021)
T2: Spa hospital-controlled touchpoints	Baydeniz et al. (2024), Dabaghi et al. (2022), Hofmann et al. (2024), Loureiro (2017)
T3: Health tourist-controlled touchpoints	Baydeniz et al. (2024), Chen et al. (2021), Elbaz et al. (2023), Kim et al. (2017), Lubowiecki-Vikuk (2022), Mishra & Panda (2023)
T4: Tourism company-controlled touchpoints	Chen et al. (2021), Elbaz et al. (2023)
T5: Social-controlled touchpoints	Chen et al. (2021), Dabaghi et al. (2022), Elbaz et al. (2023)

A in Sopot and Spa hospital B in Ciechocinek). Each participant had about 2 minutes to share their reflections on the content of the pictures. The main interview questions were ‘How do you feel seeing the situation presented in the photograph?’ and ‘Why do you feel this way?’ (Zhang et al., 2021).

The main study was preceded by a pilot study involving three spa resort visitors to make sure that the respondents understood the instructions. Several modifications were introduced and the material collected during the pilot study was not included in the main study. Furthermore, each of the respondents completed a research participation form (Appendix 2) containing socio-demographic questions. The form was consulted with experts, that is, directors of spa hospitals, a personal data protection officer, a behavioural data analyst and a professor specialising in spa tourism product management.

We used FaceReader to identify emotions (i.e., happiness, sadness, anger, surprise, fear, disgust, contempt and neutral state) and measure emotional valence (positive/negative), emotional arousal (intensity) (Hadinejad et al., 2019b) and physiological stress activation measured as heart rate variability. After the study, in line with relevant standards, the respondents received a small gift for their involvement in the research project.

The statistical analysis was carried out using descriptive statistics (mean, standard deviation, frequency) and percentages, and variance, correlation and regression analysis based on data exported from FaceReader, with scores averaged for every 0.1 second of the recording.

STUDY PROCEDURE AND RESPONDENT CHARACTERISTICS

The study was conducted in real time during face-to-face conversations held with respondents while they were staying at a spa hospital. Before data collection, participants were informed about the experimental procedure and signed a consent form. Next, they were asked to share their reflexions (subjective experience) by describing their emotional experience that occurred in the presence of the researcher. A similar approach has been used by Rime et al. (1991). Their study showed that 88–96 per cent of emotions remembered at the end of the day are verbally shared with others. At the same time, an approach like this diminishes the suppression of emotional experiences. A similar research solution has been used by Zhang et al. (2021). They compared the emotional reactions of Hong Kong residents towards tourists, expressed implicitly (via facial expressions) and explicitly (via self-reports).

In our study, a measurement lasting no longer than 30 minutes was carried out with each of the participants. It consisted of two stages:

1. Discussion with the study participant (explanation of the study procedure) and a 5-minute informed consent form for self-completion (Appendix 2).
2. A 10-minute interview carried out by one of the researchers, registered with a video camera.

The study included 30 spa resort visitors (only those of legal age who expressed informed and written consent to participate in the study) who used health tourism services in one of the two spa hospitals studied, that is, in Sopot or Ciechocinek. Consequently, the study sample (30 participants) was divided into two sub-groups depending on the location (Sopot – Spa Hospital A, Ciechocinek – Spa Hospital B).

When determining the sample size, we followed the principle of theoretical saturation reflected in the replicability of information obtained when working with empirical material (Pasikowski, 2016). This principle provides the basis for determining the sample size in the case of both qualitative studies and those based on psychophysiological measurements. Small study samples (minimum of 10 people) are commonly used in psychophysiological research (Hadinejad et al., 2019b; Kim & Fesenmaier, 2015; Zhang et al., 2021). This stems from the fact that these measurements are performed multiple times per second, which allows for a reliable assessment of differences between respondents. We initially assumed that data saturation would be achieved with 30 responses, which turned out to be sufficient.

The study involved participants of different age groups (39–88 years), with a slightly higher number of women (17 women versus 13 men) (Table 10.2).

The majority of respondents had a secondary or higher education, three people had vocational education and one had primary education. Most of them lived in large cities (> 100,000 inhabitants), but the study also included respondents from mid-sized cities, towns and villages. As for employment status, nine of the 30 respondents were active in the labour market, including one person who was in retirement at the same time. The other participants were retirees/health pensioners. Most respondents described their financial standing as 'good' or 'very good'. Several participants answered 'hard to say' and one person described their financial standing as 'poor'.

For half of the respondents, this was the first experience with spa treatment and the first stay at a spa hospital. The others had greater experience in this field, as they had visited spa resorts more than three times (eight respondents) or two to three times (seven respondents). Previous studies indicate that the elderly most commonly choose health-related stays at spa resorts and are usually 'quite happy' or 'very happy' with this type of service (e.g., Dryglas & Salamaga, 2017).

The respondents learned about the spa resort mainly from their primary healthcare physician providing healthcare services under contract with the National Health Fund (NFZ). It is not surprising that the majority of study participants benefited from a stay subsidised by NFZ, Social Insurance Company, State Fund for Rehabilitation of People with Disabilities, Agricultural Social Insurance Fund or other institutions. Several respondents (six people) were full-paying patients who had covered the entire cost of their stay with their own funds. Some respondents had learned about the spa resort from websites and social media. Others declared they had known the spa resort for a long time. Family/friends or mass media were indicated by the respondents to a lesser extent.

Table 10.2 Participant profile and experience with spa resorts (n = 30)

No.	Gender	Age	Education	Place of residence size	Employment status	Financial standing	Number of visits to spa resort	Source of information about spa resort	Source of funding for spa resort stay
1	Female	61	Higher	Town ≤ 50,000 inhabitants	Retiree/health pensioner	Very good	> 3 times	NFZ physician	NFZ, other*
2	Female	69	Secondary	City 51,000–100,000 inhabitants	Retiree/health pensioner	Good	1st time	Websites/social media	NFZ, other*
3	Female	66	Secondary	Town ≤ 50,000 inhabitants	Retiree/health pensioner	Hard to say	> 3 times	Websites/social media	NFZ, other*
4	Male	57	Higher	City > 500,000 inhabitants	Employed	Very good	> 3 times	Mass media	NFZ, other*
5	Female	75	Secondary	City 101,000–500,000 inhabitants	Retiree/health pensioner	Good	1st time	Websites/social media	NFZ, other*
6	Female	67	Secondary	City 101,000–500,000 inhabitants	Retiree/health pensioner	Good	1st time	Websites/social media	NFZ, other*
7	Female	75	Primary	City 51,000–100,000 inhabitants	Retiree/health pensioner	Good	1st time	NFZ physician	NFZ, other*

No.	Gender	Age	Education	Place of residence size	Employment status	Financial standing	Number of visits to spa resort	Source of information about spa resort	Source of funding for spa resort stay
8	Female	72	Secondary	Town $\leq$ 50,000 inhabitants	Retiree/health pensioner	Good	1st time	Websites/social media	NFZ, other*
9	Male	88	Vocational	City 101,000–500,000 inhabitants	Retiree/health pensioner	Very good	> 3 times	NFZ physician	NFZ, other*
10	Female	68	Secondary	City 51,000–100,000 inhabitants	Employed retiree/health pensioner	Good	1st time	NFZ physician	NFZ, other*
11	Male	74	Secondary	Village	Retiree/health pensioner	Hard to say	1st time	NFZ physician	NFZ, other*
12	Male	60	Vocational	City 51,000–100,000 inhabitants	Employed	Good	2nd–3rd time	NFZ physician	NFZ, other*
13	Male	70	Secondary	Town $\leq$ 50,000 inhabitants	Retiree/health pensioner	Hard to say	2nd–3rd time	NFZ physician	NFZ, other*
14	Female	70	Higher	City > 500,000 inhabitants	Retiree/health pensioner	Good	1st time	NFZ physician	NFZ, other*

No.	Gender	Age	Education	Place of residence size	Employment status	Financial standing	Number of visits to spa resort	Source of information about spa resort	Source of funding for spa resort stay
15	Male	47	Higher	City 101,000–500,000 inhabitants	Employed	Good	1st time	NFZ physician	NFZ, other*
16	Female	68	Secondary	Town ≤ 50,000 inhabitants	Retiree/health pensioner	Good	> 3 times	NFZ physician	Own funds
17	Male	71	Secondary	Town ≤ 50,000 inhabitants	Retiree/health pensioner	Good	> 3 times	NFZ physician	NFZ, other*
18	Male	70	Secondary	City 101,000–500,000 inhabitants	Retiree/health pensioner	Hard to say	2nd–3rd time	NFZ physician	NFZ, other*
19	Female	69	Higher	City 101,000–500,000 inhabitants	Employed	Good	2nd–3rd time	NFZ physician	NFZ, other*
20	Female	55	Higher	Village	Employed	Good	1st time	NFZ physician	NFZ, other*
21	Male	70	Higher	City 101,000–500,000 inhabitants	Retiree/health pensioner	Hard to say	2nd–3rd time	'I've known this spa resort for a long time'	NFZ, other*

No.	Gender	Age	Education	Place of residence size	Employment status	Financial standing	Number of visits to spa resort	Source of information about spa resort	Source of funding for spa resort stay
22	Female	73	Vocational	City 101,000–500,000 inhabitants	Retiree/health pensioner	Good	2nd–3rd time	'I've known this spa resort for a long time'	Own funds
23	Female	57	Secondary	Village	Employed	Good	1st time	NFZ physician	NFZ, other*
24	Male	65	Vocational	Village	Retiree/health pensioner	Good	2nd–3rd time	NFZ physician	NFZ, other*
25	Male	52	Higher	Town ≤ 50,000 inhabitants	Employed	Very good	> 3 times	'I've known this spa resort for a long time'	Own funds
26	Female	72	Secondary	Town ≤ 50,000 inhabitants	Retiree/health pensioner	Poor	1st time	NFZ physician	NFZ, other*
27	Female	80	Higher	City > 500,000 inhabitants	Retiree/health pensioner	Good	1st time	NFZ physician	NFZ, other*
28	Male	77	Secondary	City > 500,000 inhabitants	Retiree/health pensioner	Good	> 3 times	'I've known this spa resort for a long time'	Own funds

No.	Gender	Age	Education	Place of residence size	Employment status	Financial standing	Number of visits to spa resort	Source of information about spa resort	Source of funding for spa resort stay
29	Female	74	Higher	City > 500,000 inhabitants	Retiree/health pensioner	Good	1st time	Family/friends	Own funds
30	Male	39	Higher	City > 500,000 inhabitants	Employed	Good	1st time	Family/friends	Own funds

Note: Group 1 (1–15) from Spa hospital A, group 2 (16–30) from Spa hospital B; NFZ – National Health Fund; * Social Insurance Company (ZUS), State Fund for Rehabilitation of People with Disabilities (PFRON), Agricultural Social Insurance Fund (KRUS) or other institutions.

11. Recognising mixed emotions of spa service consumers (health tourists) using FaceReader

EXPRESSED EMOTIONS AND DYNAMICS OF EMOTIONAL AROUSAL

The present proof-of-concept study allowed for real-time measurement of emotions in customer experience. We analysed facial expressions focusing on a neutral state (i.e., no facial expression as compared to the baseline), negative expressions (i.e., sadness, anger, surprise, fear, disgust and contempt) and a positive expression (i.e., happiness).

The results obtained point to a moderate activation of study participants during the task – the mean arousal was 31.64 per cent. This confirms participants' involvement in the communication situation, but at the same time shows that they did not go through any sustained, strong experiences that would motivate them to take action. The direction of the emotional dynamics leaned slightly towards negative emotions – the mean valence was -0.052 (Table 11.1).

The mean result for the entire sample showed that the standard facial expression corresponded to the neutral model in 67.81 per cent, which suggests a rather intensive expression of emotions in the faces of study participants. Two emotions had the greatest impact on the general emotional dynamics: disgust, responsible for the mean facial expression intensity of 4.29 per cent, and happiness, responsible for 4.28 per cent (Table 11.1). A considerably lesser role was played by sadness (2.69 per cent), anger (2.09 per cent), surprise (1.99 per cent) and fear (1.73 per cent). Finally, contempt (0.48 per cent) had the least impact on emotional dynamics. Happiness and disgust determined two basic disjoint strategies of emotional response – both these signals had a strong impact on emotional valence (happiness: $r = 0.655$, $p < 0.01$; disgust: $r = -0.701$, $p < 0.01$) (Table 11.2). Furthermore, disgust was negatively correlated with the arousal level, leading to reduced emotional activation ($r = -0.405$, $p < 0.05$).

The neutral condition was most consistently reduced by sadness ($r = -0.530$, $p < 0.01$), indicating that this emotion triggered more intense facial signals in general. Surprise ($r = -0.390$, $p < 0.05$) and, to a lesser extent, fear ($r = -0.325$, $p < 0.10$) were also significant factors reducing the neutral state. The

Table 11.1 Respondents' facial expression of emotions

Variable	Mean	Baseline (median)	Sample range (min–max)
Emotional valence	–0.0520	–0.0226	–0.98–+0.99
Emotional arousal (%)	31.64	30.57	0–99
Neutral state (%)	67.81	68.41	0–100
Emotional expressions (%): happiness	4.28	0.00	0–99
Emotional expressions (%): sadness	2.69	0.09	0–96
Emotional expressions (%): anger	2.09	0.01	0–92
Emotional expressions (%): surprise	1.99	0.03	0–91
Emotional expressions (%): fear	1.73	0.02	0–84
Emotional expressions (%): disgust	4.29	0.09	0–98
Emotional expressions (%): contempt	0.48	0.04	0–92

Note: Results for the most important variables measured in FaceReader 8.1. The number of individual measurements in the entire sample for each variable was 167,654 coded units (accuracy 0.1 seconds).

occurrence of the other facial signals did not preclude a higher mean result for the neutral state. Apart from the expression of happiness, it was the neutral state that affected the mean value for valence, which means that experience attenuation (through emotional regulation) was important for the way in which negative emotions were neutralised.

The expression of happiness and disgust had a disjoint character. This means that when one of the values increased in a given participant, the other value generally decreased ($r = -0.380$, $p < 0.05$). Higher prevalence of surprise coincided with more intense signals of sadness, whereas more intense sadness was conducive to stronger signals of happiness (which was also a form of emotional self-regulation).

Our data analysis enabled the identification of three predominant strategies used by respondents in response to the task, confirming the dynamic nature and diversity of emotional reactions in customer experience. In the case of individual models of emotional response, the most commonly used strategy involved regulating emotions through happiness or disgust (10 participants in each group). Significantly fewer respondents (only four) centred their emotional expressions around anger, and three participants approached the task with nearly complete neutrality (Appendix 3). The other models of emotional directionality, through signals of fear or sadness, were marginal to the overall

Table 11.2 Correlations between facial expressions of emotions

Emotion	Valence	Arousal	Neutral state	Happiness	Sadness	Anger	Surprise	Fear	Disgust	Contempt	Heart rate
Valence	0.00	–	–	–	–	–	–	–	–	–	–
Arousal	0.237	0.00	–	–	–	–	–	–	–	–	–
Neutral state	0.410**	0.104	0.00	–	–	–	–	–	–	–	–
Happiness	0.655***	–0.028	–0.218	0.00	–	–	–	–	–	–	–
Sadness	–0.047	–0.042	–0.530***	0.410**	0.00	–	–	–	–	–	–
Anger	–0.314*	–0.190	–0.258	–0.014	–0.153	0.00	–	–	–	–	–
Surprise	–0.042	0.420**	–0.390**	0.006	0.341*	–0.078	0.00	–	–	–	–
Fear	–0.387**	0.159	–0.325*	–0.155	0.178	–0.106	0.216	0.00	–	–	–
Disgust	–0.701***	–0.405**	–0.298	–0.380**	–0.044	0.014	–0.168	–0.130	0.00	–	–
Contempt	0.083	0.231	0.061	0.054	0.303	–0.038	0.299	–0.004	–0.217	0.00	–
Heart rate	0.149	–0.080	0.243	–0.008	–0.089	–0.335*	–0.138	0.153	–0.114	0.019	0.00

Note: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

individual behaviour observed, thus they cannot be treated as models bearing any relevance to explaining the experience studied. Despite it having a subtle effect on the dynamics of emotional expression, happiness was the most important signal in the case of the neutral state. Even though it had been established that sadness and fear did not occur at the same time, they actually did and were expressed independently of each other. However, in the context of the entire study, when no other strong emotional signals occurred, a higher intensity of one of them translated into a subsequent stronger expression of the other, which may inspire further research on this subject.

As the timeline of facial signals ensured the accuracy of 0.1 seconds, we were able to use regression analysis to determine relationships between the variables. We found that valence was positively associated with emotional arousal. This means that positive emotions were more engaging and motivating, whereas negative emotions were more conducive to passivity and distancing. This finding is highly interesting and counterintuitive. Usually, higher arousal is associated with two paths: positive enthusiasm and anger-induced mobilisation. However, in this case, anger did not motivate action, as it was regulated by the sense of helplessness and subsided due to passive negative emotions (especially disgust). Valence was positively influenced by happiness, surprise and contempt and negatively affected by disgust, sadness, anger, fear and somewhat the neutral state. The latter case is interesting. When looking at the overall value, the neutral state was conducive to positive valence. However, the detailed timeline shows that it was more strongly associated with the expression of negative emotions.

Moreover, the timeline of facial signals offers a detailed look at the relationship between emotional arousal and the other variables analysed, for example, the association between arousal and valence that we mentioned earlier. We noticed that positive valence accompanied cases of strong activation and motivation for action. At the same time, the strongest relationship was observed between signals of happiness and emotional arousal, which suggests a significant role of enthusiasm and engaging excitement in participants' experience of positive emotions. Other factors that intensified arousal were anger, surprise, fear and contempt, with the latter – contrary to our expectations – playing a similar role to the strongly engaging happiness.

Detailed associations between the neutral state and the emotions presented in the timeline indicated which emotions reduced neutrality to the greatest extent at the time of their expression. In other words, we could see whether the intensity of a given emotion was subtle or low, or maybe high or very high. Happiness had the strongest effect on the neutral state, reducing it to a great extent ($F = 2946.62, p < 0.01$). A slightly more modest effect was observed in the case of surprise – whenever it occurred, its signals were intense, enhancing emotional expression ($F = 305.95, p < 0.01$). An important role in emotional

dynamics was also played by sadness, anger and disgust. The lowest effect was observed for fear and contempt, which means that whenever these two emotions emerged, their expression was subtle, reducing the neutral state only to a small degree.

The expression of *happiness* was crucial for the regulation of valence and neutrality and very important for the level of emotional arousal. Furthermore, happiness commonly occurred as a regulatory response to sadness or fear. In turn, the presence of disgust or surprise decreased the likelihood of happiness expression. Anger and contempt were not associated with this emotion. The audio-visual material analysed revealed three functions of the expression of happiness: (1) it suggested an enthusiastic reaction to the task performed and motivating excitement; (2) it served as a mechanism of emotional balance, regulating the unpleasant experience of sadness or fear; and (3) it constituted an independent mechanism, precluding emotional dynamics oriented towards disgust.

The expression of *sadness* also regulated valence and the neutral state, but it was less significant for the emotional arousal of participants. The timeline showed that sadness triggered regulation behaviours related to the expression of happiness and, at the same time, contributed to the intensification of anger signals. On the other hand, the presence of sadness reduced the possibility of a simultaneous expression of surprise, fear, contempt and disgust. This illustrates the networked nature of emotional reactions in the study sample. What is interesting is the disjoint character of sadness and fear. Although these two types of negative expressions were regulated in a similar way, through the arousal of positive emotions, other negative facial expressions did not produce such an effect.

Apart from its effect on valence and the neutral state and its moderate impact on the arousal level, *anger* had the strongest association with contempt. This justifies an assumption that the combination of these two emotions formed a third typical strategy used by participants in response to the study task. The weaker relationship between anger and emotional arousal suggests that contempt was important for anger regulation through the sense of helplessness (lack of any significant motivation for action), enabling a redirection of negative feelings onto individuals who were perceived by respondents as being responsible for the unpleasant situation. The results confirm the disjointed character of anger and fear, which are separate emotional responses generated when assessing potential threats in the environment. What is interesting is the clear disconnect between anger and disgust, which points to a lack of aggressive motivations or orientation towards violent behaviours in study participants, especially in the context of the statistically significant relationship between anger and contempt which, by evoking disgust, may lead to destructive behaviour (Plutchik, 1980). Furthermore, surprise decreased the likelihood of a simultaneous expression

of anger, sadness increased it slightly and happiness was not associated with anger expression whatsoever.

Surprise reduced the neutral state, having a positive effect on valence and emotional arousal. Most often, it accompanied the expression of fear, which partly stems from the activation of the same muscles involved in both signals and is reflected in the majority of studies using the Facial Action Coding System/FaceReader. Surprise was a temporary replacement emotion, lowering the possibility of a simultaneous expression of sadness, anger, disgust, happiness and contempt, which is consistent with the neutral and anticipatory character of this emotion.

The expression of *fear* had a noticeable effect on negative valence, lower intensity of the neutral expression and quite a dynamic increase in emotional arousal along with fear intensification. The emotion was often expressed together with surprise and, more interestingly, co-occurred with happiness, pointing to a regulatory behaviour in participants. The presence of fear decreased the likelihood of the expression of contempt, anger, sadness and disgust signals, with the mechanism linking anger with contempt being a separate strategy from that of non-verbal communication of fear.

The analysis of emotional dynamics showed that *disgust* was the predominant emotion expressed by respondents. Disgust had a significantly negative effect on valence. It significantly reduced emotional arousal and regulated the neutral expression. The expression of disgust was not associated with the intensification of any other emotional signals. The occurrence of disgust was very different from that of anger and contempt which co-created one of the three most frequent strategies of reacting to the study task, competing with that oriented towards disgust. Furthermore, the signals of disgust significantly reduced the occurrence of surprise, sadness, happiness and fear, which shows the importance of negative distancing from the stimuli and aversion towards them in the experience of respondents. Thus, it is worth addressing this special role of disgust in the expression of non-verbal signals when analysing the experiences of health tourists.

Contempt was the least intensely represented emotion in the entire timeline of emotional dynamics in the study sample. This is not surprising, as it is a short and fleeting signal, which often complements signals of other emotions. Moreover, contempt is relatively well controlled, as it is quickly identified as a sense of superiority and distancing. The presence of contempt had a positive effect on emotional arousal and, at the same time, was slightly conducive to a positive vector of emotional dynamics, as it diminished signals of other negative emotions. Furthermore, it slightly reduced the natural expression. The signals of contempt did not affect the expression of happiness and sadness, but they intensified anger and diminished disgust, fear and surprise. This confirms the cognitive way of experiencing this emotion, which is often associated with

the rationalisation and redirection of anger onto other people. Moreover, contempt occurs in situations other than those characterised by the high intensity of other emotions, hence its separation from or independence of other signals.

DIFFERENCES IN THE EXPRESSION OF EMOTIONS RELATED TO CUSTOMER EXPERIENCE IN VARIOUS DESTINATIONS

We analysed whether the emotional reactions of study participants differed depending on the customer experience touchpoints and destination (Spa hospital A located in Sopot; Spa hospital B located in Ciechocinek). Visitors to Spa hospital A reacted to the task with much more negative emotions expressed as facial signals (valence = -0.089) as compared to Spa hospital B visitors (valence = -0.016) (Table 11.3). At the same time, their activation stemming from emotional arousal was lower – 31.02 versus 32.23 per cent. There was a significant difference in the intensity of the neutral expression – respondents from Spa hospital A displayed neutrality in 61.47 per cent, whereas the other participant group was much less emotional ($M = 73.96$ per cent). We also observed differences pertaining to the dynamics of expression of individual emotions between the two groups. The most intense emotion experienced by respondents from Spa hospital A was disgust (6.15 per cent), followed by sadness (3.45 per cent), happiness (3.32 per cent), surprise (2.98 per cent) and fear (2.79 per cent). The least intense emotions in this group were anger (1.38 per cent) and contempt (0.75 per cent). In turn, the other group was strongly oriented towards happiness (5.20 per cent), with complementing emotions of anger (2.78 per cent), disgust (2.49 per cent) and sadness (1.95 per cent). Surprise (1.03 per cent), fear (0.71 per cent) and contempt (0.21 per cent) were of marginal importance in this group. The differences between the two groups are a good illustration of the clear separation of response strategies oriented towards disgust expression (predominant in Spa hospital A) and happy excitement (predominant in Spa hospital B).

What is also interesting is the differences in baseline values between the two groups. The results observed in the Spa hospital A group point to a negative valence (-0.044), whereas those in the other group indicate a neutral state (-0.010). The difference in the mean emotional arousal exceeds 1 (29.93 versus 31.25 per cent), balancing on the verge of a moderate level. The neutral state baseline differed significantly between the two groups. In the first group (Spa hospital A), the mean value was only 59 per cent, whereas in the other one it was as high as 79 per cent. This means that respondents from Spa hospital B displayed greater indifference and distance towards the study task. There were no statistically significant differences in the case of happiness, anger and contempt signals (0.15 versus 0.05 per cent). Surprise (0.07 versus 0.02 per cent),

Table 11.3 Mean values of facial expressions of emotions in customer experience in different destinations among respondents

Group	N	Valence	Arousal	Neutral state	Happiness	Sadness	Anger	Surprise	Fear	Disgust	Contempt	Heart rate
All	30	-0.0520	31.64	67.81	4.28	2.69	2.09	1.99	1.73	4.29	0.48	70
Spa hospital A	15	-0.0887	31.02	61.47	3.32	3.45	1.38	2.98	2.79	6.15	0.75	71
Spa hospital B	15	-0.0164	32.23	73.96	5.20	1.95	2.78	1.03	0.71	2.49	0.21	68

Table 11.4 Emotional arousal and neutral emotions at baseline and customer experience touchpoints

Variable	Mean	Baseline	Touchpoint 1: Nature-controlled touchpoints	Touchpoint 2: Spa hospital-controlled touchpoints	Touchpoint 3: Health tourist-controlled touchpoints	Touchpoint 4: Tourism company-controlled touchpoints	Touchpoint 5: Social-controlled touchpoints
Valence	-0.0520	-0.0226	-0.0430	-0.0470	-0.0512	-0.0554	-0.0654
Emotional arousal (%)	31.64	30.57	31.72	30.97	31.84	31.56	32.17
Neutral state (%)	67.81	68.41	67.59	65.94	67.52	68.77	69.38

Note: Results for the most important variables measured in FaceReader 8.1. The number of individual measurements in the entire sample for each variable was 167,654 coded units (accuracy 0.1 seconds).

fear (0.07 versus 0.01 per cent) and disgust (0.20 versus 0.04 per cent) were generally stronger in the first group.

We also analysed emotional responses to customer experience touchpoints. Their selection depends on the type of service provided or the industry context. In the case of health tourism, the touchpoints pertain to the service setting, which includes the service environment, social surroundings and the service experience determining the basic emotional state of a tourist (Angelini & Carmignani, 2017; Brunner-Sperdin et al., 2012). The touchpoints selected allowed for carrying out an analysis in five time segments: T1 – nature-controlled touchpoints; T2 – spa hospital-controlled touchpoints; T3 – health tourist-controlled touchpoints; T4 – tourism company-controlled touchpoints; and T5 – social-controlled touchpoints.

We observed some differences in emotional dynamics between individual time segments (Table 11.4). In the case of valence, participant reactions at T1 and T2 were less negative and those at T3 were slightly more positive than the mean (for the entire recording). The signals of negative emotions were clearly more intense at T4 and T5. What also transpired was the cumulative effect of the negative affect, as the emotions experienced in the initial part seemed to facilitate stronger emotional responses in the subsequent fragments of the recorded tasks.

Emotional arousal did not have such a linear character. At T1, it was on average slightly higher than the mean value for the entire recording, which might stem from the additional mobilisation or activation related to the participation in the study. At T2, it clearly decreased, suggesting a more passive way of experiencing emotions, as the change in the emotional vector indicated that the reactivity of participants did not decrease in this time segment. At T3, the arousal increased again above the mean and then slightly decreased in T4. T5 is clearly different, as the mean arousal level was higher than 32 per cent.

The time variability of the neutral expression at T1–T5 is very interesting (Table 11.5). At T2, the neutral expression clearly decreased, which suggests more intense facial expressions, especially those related to emotional signals. It needs to be emphasised that this observation was also consistent for both the Spa hospital A group and Spa hospital B group, even with slightly different baselines for the neutral state. Starting from T3, the neutral expression gradually increased, reaching 69.38 per cent at T5, which is over two percentage points higher than the overall mean. Likewise, the value of negative valence increased over time. This demonstrates the variability of emotional responses in study participants.

We verified which of the emotions analysed were predominant in the individual time segments associated with the touchpoints (T1–T5). The touchpoint which stood out was T4. In this time segment, all emotions apart from disgust displayed clearly lower intensity. This applied particularly to happiness and surprise. What follows is that this touchpoint was considerably less conducive

Table 11.5 Facial expressions of emotions at baseline and customer experience touchpoints

Variable – emotional expressions	Mean	Baseline	Touchpoint 1: Nature-controlled touchpoints	Touchpoint 2: Spa hospital-controlled touchpoints	Touchpoint 3: Health tourist-controlled touchpoints	Touchpoint 4: Tourism company-controlled touchpoints	Touchpoint 5: Social-controlled touchpoints
Happiness	4.28	0.00	3.72	5.10*	4.50*	3.83	4.20
Sadness	2.69	0.09	2.15	3.04*	2.17	2.57	3.63*
Anger	2.09	0.01	2.10	1.92	2.11	2.07	2.31*
Surprise	1.99	0.03	2.26*	2.25*	2.31*	1.68	1.39
Fear	1.73	0.02	1.27	1.94*	2.21*	1.61	1.65
Disgust	4.29	0.09	3.85	4.30	4.38	4.35	4.60*
Contempt	0.48	0.04	0.68*	0.46	0.34	0.41	0.48

Note: Results for the most important variables measured in FaceReader 8.1. The number of individual measurements in the entire sample for each variable was 167,654 coded units (accuracy 0.1 seconds). * The results representing significantly higher intensity than the mean for a given emotion.

to triggering emotional signals as compared to the other touchpoints. The emotional valence was negative, disgust was minimally elevated and the values for anger and contempt were close to the mean.

Facial expressions at T1 were also less intense as compared to the other touchpoints. The signals of happiness, sadness, fear and disgust were clearly weaker, the value for anger was similar to the mean and only surprise and contempt were expressed with higher intensity. We previously stated that helplessness is regulated through the combination of anger and contempt. At T1, this mechanism was activated very early on. Anger became slightly more associated with disgust only at T5.

T2 turned out to be by far the most emotional touchpoint for participants. This translated into a substantially reduced neutral expression. The fact that we did not observe any strong shift of the emotional dynamics vector (neutral valence) indicates that the signals were quite even, with a slight orientation towards negative emotions. Greater emotionality of reactions did not translate into higher emotional arousal – higher values for happiness and fear were regulated through a greater intensity of anger and the passive effect of increased sadness. As with T1, surprise proved to be important for emotional dynamics.

T3 served a transformative function in the facial expression dynamics observed. This was the last touchpoint at which study participants frequently experienced surprise. At the subsequent touchpoints, anticipation and expression of this emotion were no longer so relevant. At the same time, the expression of both happiness and fear was intense, as it was at T2, but the intensity of sadness decreased. Furthermore, the expression of anger and disgust, essential at T5, gradually increased. These changes demonstrate a somewhat transitional character of this touchpoint, which was additionally modified by the lowered emotional intensity at T4.

T5 saw by far the strongest presence of negative emotions. The slightly weaker signals of happiness and fear and the clearly lower expression of surprise did not offset the higher intensity of the other emotions, leading to stronger emotional arousal. The predominant facial expression was disgust, with sadness and anger playing the role of complementary emotions alongside happiness, which remained the second most important emotional response strategy, as it did throughout the study. What is also worth noting is the high value for sadness, which generally was a secondary emotion, in line with the dynamics of non-verbal behaviour. In this case, sadness had a distinct effect on the comprehensive facial expression of participants. Interestingly, although the pronounced effect of sadness was present in both groups at T5, it was clearly stronger in the Spa hospital A group (+28 versus +23 per cent as compared to the mean value for the entire study).

PHYSIOLOGICAL STRESS ACTIVATION

The automated facial action coding system FaceReader 8.1 allows for analysing physiological stress activation measured as heart rate variability (HRV) based on the light reflectance of the skin (changes in blood supply) using the Remote Photoplethysmography algorithm. The software does not have sufficient measurement accuracy to be treated as an alternative to traditional contact sensors (Benedetto et al., 2019) but can be used for high-precision measurements of HRV, which reflects the activation of the sympathetic and parasympathetic nervous systems, thus being a great solution in research and marketing settings. This has been confirmed in various studies, for example, that by Castillo et al. (2020), who showed that the use of FaceReader to estimate heart rate in older adults generates reliable results.

In our study, the mean HR value was 70 bpm, which is consistent with the resting character of the task. The baseline value for the total of 158,831 individual measurements in the study sample was slightly lower, amounting to 68 bpm. Participants represented three different strategies associated with physiological stress and its activation:

- Slight HRV over time relative to the individual baseline value, suggesting no significant stressors (12 participants: 2, 3, 6, 9, 10, 11, 16, 19, 21, 22, 27, 28).
- Moderate HRV over time relative to the individual baseline value, suggesting that participants experienced both highly emotional moments and strong attenuation of arousal (10 participants: 1, 5, 7, 8, 14, 15, 20, 25, 26, 30).
- Significant HRV over time relative to the individual baseline value, suggesting the presence of at least one major stressor, which, nevertheless, did not result in physiological stress experience throughout the entire study (8 participants: 4, 12, 13, 17, 18, 23, 24, 29).

It needs to be emphasised that higher HR over time, with the measurement accuracy of 0.1 seconds, did not coincide with higher emotional arousal, which means that the activating emotions experienced by participants were not stressful and did not lead to higher physiological activation. This corroborates our previous observation, namely, that the predominant emotion motivating participants for action was happiness, which often has a regulatory effect on heart rate. Heart rate was significantly elevated when participants expressed contempt and decreased when they signalled anger, which is somewhat counterintuitive. However, it is possible to understand this finding in light of the already mentioned hypothesis of the combined activation of contempt and anger, with

contempt regulating the sense of helplessness and thus diminishing anger when the stress response is strongly activated by unpleasant negative emotions. As expected, and in line with the result interpretation proposed, intense happiness was conducive to higher heart rate, which confirms that excitement served as a motivating strategy when reacting to the study task.

It is unusual that higher values for the estimated heart rate accompanied intense signals of sadness, as such a relationship between this emotion and physiological stress is not common and obvious. This can be explained by the more frequent co-occurrence of sadness and regulatory signals of happiness and anger, which may trigger excitement or stress. It cannot be excluded that the experience of sadness was stressful in itself, as it may have hindered participants from completing the task or increased their emotional agitation caused by their own experiences, which would also result in the relationship observed. A slight increase in heart rate was also observed in cases of greater neutrality, but it was substantially lower as compared with happiness and sadness, and less significant than the negative effect of anger signals on the intensity of stress activation. There were no statistically significant associations of surprise, fear or disgust with heart rate measured with Remote Photoplethysmography.

The relationship between heart rate and the intensity of anger expression is presented in Figure 11.1. Anger signals were stronger at the onset of physiological stress activation. However, its expression was not necessarily relevant for emotional response at moments of peak physiological stress activation.

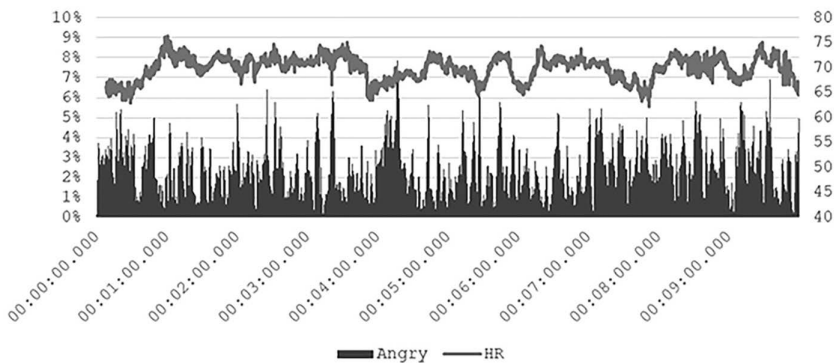


Figure 11.1 Relationship between heart rate (HR) and anger expression intensity in participants ($n = 30$)

12. Recognising and measuring consumer emotions during the experience: theoretical issues and recommendations for action

The measurement of emotions in customer experience is usually carried out with the use of traditional self-report and retrospective (*ex post*) questionnaire-based measures. It is performed in the last stage of customer experience, which often prompts criticism and accusations of data subjectivity. Therefore, researchers are increasingly interested in using objective measures in studies exploring mixed emotions in a holistic customer experience. Especially since, as pointed out by Godovykh (2022) and Keiningham et al. (2019), inferencing about customer experience requires measuring it in real time. Furthermore, real-time in situ measurement of customer experience provides a better understanding of the variability and occurrence of the various emotions experienced at specific customer journey touchpoints (e.g., Oh & Kim, 2022; Wang et al., 2021). Understanding how customers react to different aspects of a product, service or brand is of great importance for businesses and customer experience management.

Technological advances have made it possible to recognise and measure customer emotions with methods other than self-report tools. Thus, researchers have started to increasingly use neurophysiological-based techniques. To illustrate the possibilities of using this approach to measure emotions in customer experience, we decided to focus on emotion recognition based on facial expressions.

To verify the possibilities (advantages and limitations) of using automated facial expression analysis to recognise emotions in customer experience, we employed FaceReader version 8.1. FaceReader provides key information about the predominant emotion, valence, arousal and intensity of basic emotions in study subjects (Landmann, 2023; Skiendziel et al., 2019). The software also offers estimated heart rate. However, these results should be treated with caution, as they are generated by an algorithm which analyses the main arteries around the face (Remote Photoplethysmography Module) (Den Uyl & Van Kuilenburg, 2005).

What is important in identifying and measuring emotions in customer experience is the context. Our study has been performed in the service experience setting. Services are more likely to evoke emotions in customers than products, regardless of whether they are utilitarian or hedonic in nature (Ponsignon, 2023). This stems from numerous and varied interactions characterised by emotional arousal between the customer and the company or brand (e.g., Batat, 2020; Klaus, 2015; Lemon & Verhoef, 2016).

Based on the real-time in situ experience of spa service customers (health tourists), we identified their basic emotions and the neutral state together with contempt, which ultimately allowed a discussion on methodological issues. This study also helped to outline the research procedure using FaceReader, offering recommendations for action.

THEORETICAL ISSUES: HOW TO FURTHER USE THE EMOTION RECOGNITION METHODOLOGY IN CUSTOMER EXPERIENCE

Facial expressions constitute an area of scientific interest for researchers working in the fields of psychology, neuroscience as well as marketing and consumer behaviour. In their attempts to search for and understand customers' unique characteristics, in this case emotions, researchers turn to a variety of methods and tools to capture these specific features in a holistic or at least fragmentary way, for example, by focusing on a selected, single emotion. However, facial expressions are highly varied and thus difficult to describe comprehensively, even for experienced and trained individuals (Gu & Ji, 2004). Customer experience researchers may face different dilemmas about maintaining methodological rigour when designing and carrying out studies and analysing data.

Contributing to the discussion about emotion recognition in customer experience, based on our proof-of-concept research into holistic experiences of customers using spa services, we offer several suggestions that would help to partially answer the following question:

- What dilemmas do researchers face when recognising mixed emotional states in customer experience research using objective measures based on facial expressions?

A successful application of physiological and neuroscientific measures requires a discussion of standards for their implementation that would ensure methodological rigour. This also applies to the use of automated facial expression recognition analysis (or facial expression analysis). Although there have been numerous studies on its use (e.g., Ben et al., 2022; De la Torre & Cohn, 2011;

Küntzler et al., 2021; Tian et al., 2005), there is still a need to discuss standards and good practices that would allow for the development of a study procedure, consideration of data determinants and bias and formulation of codes for researchers (study investigators).

Automated facial expression analysis is associated with a number of challenges in study procedure design. The results of studies employing automated facial expression analysis will largely depend on the video database used for emotion recognition (De la Torre & Cohn, 2011). This is associated with, on the one hand, controlling the measurement conditions so as to record good-quality material, allowing face acquisition, feature extraction and, consequently, facial expression recognition and, on the other hand, sampling challenges.

In the former case, it is necessary to ensure that the face and facial features are visible in the recordings. Differences in lighting, changes in the respondent's pose, occlusion or individual differences (De la Torre & Cohn, 2011) remain a challenge in study design and calibration. This is especially so with regard to studies conducted during experience/service consumption, when respondents or customers may assume different poses when experiencing emotions or reacting to specific touchpoints, which makes video registration difficult (e.g., when the subjects move their heads excessively). These movements, face orientation or background and lighting may affect face expression analysis (Tian et al., 2005).

Another aspect to consider when planning a study that will employ automated facial expression analysis to recognise emotions in customer experience is selecting the study sample. The study should exclude individuals with health contraindications, that is, those who undergo psychopharmacological therapy and suffer from cardiovascular disease (Behnke et al., 2024; Landmann, 2023). Participation of minors is possible only with the written consent of parents or legal guardians. Researchers should be aware of the fact that any participant can withdraw from the study at any stage. Therefore, they must be ready to look for alternative solutions, such as enrolling participants through the Internet, that is, portals and applications that allow video meetings.

The age of study subjects is relevant in emotion recognition research. For instance, facial muscle movements may be more difficult to (automatically) detect in younger children, especially infants, because they have higher levels of subcutaneous fat and less pronounced facial features (e.g., Oster, 2003; Zaharieva et al., 2024). In turn, participants aged over 60 years may be characterised by negative affect. This is a consequence of a tendency for lower mood, which increases with age, and age-independent negative anticipatory regulation, which is found particularly in older males (Jasielska, 2011). Our study also showed that the elderly felt mixed emotions when experiencing spa services, based on affective states related to the people, the environment and the organisation and service during their stay at a spa resort. Positive emotions

in people aged 60–85 years are usually associated with their admiration for nature, harmonious human–nature relationship, cultural heritage and other people (Moal-Ulvoas, 2017). At the same time, we observed a higher intensity of negative emotions in our respondents, that is, disgust, anger and fear, but, interestingly, not sadness or contempt. The lack of contempt may stem from the fact that, through participation in health tourism, older individuals reflectively give positive meaning to their lives and, generally, cultivate kind relationships with other people (Moal-Ulvoas, 2017).

The use of automated facial expression recognition is not without ethical concerns. The researcher's decisions should be thoughtful and responsible, aligned with the scientific value of a given research project, as well as meeting ethical criteria that protect the interests of the researcher, other researchers and participants in a given study. At the design stage, the research project should be consulted with an ethics board and, in the case of research experiments, with a bioethics committee. This will ensure transparency of the research procedure in accordance with relevant standards and ethical principles. The researcher (investigator) should also consider such issues as participation experience, privacy and data management access and usability (Behnke et al., 2024). In this context, it is the researcher's task to minimise the number of risks associated with the use of emotion recognition methods and tools. These risks may include negative customer emotions related to the actual course of the study, collecting, processing, storing, sharing personal and biological information, commercial technology validity and reliability and exclusivity issues (Behnke et al., 2024). A specific ethical conduct strategy will be helpful in identifying and minimising potential risks. This may be, for example, the checklist for researchers' convenience proposed by Behnke et al. (2024). Adapting the checklist to meet the needs of a particular research project can help researchers prepare and carry out research employing facial expression recognition analysis.

When planning to use automated facial expression recognition, it is important to consider the researcher's competences. Our literature review showed that automated facial expression recognition is not as frequently used in customer experience research as self-report measures. This may stem from researchers' low level of technical competence to conduct extensive research focused on a holistic approach to customer experience and customer emotions, or researchers' concerns about using other, less familiar methods, tools and techniques. In turn, those who employ them are often unaware of the limitations of the technology and may use the tools in potentially detrimental conditions (Hernandez et al., 2021). Furthermore, interpersonal skills are important in cases when the researcher is directly involved in study implementation. What is desirable in this type of research is establishing a relationship with and gaining the trust of participants. Treating participants with respect emphasises their autonomy,

with special attention shown to, for example, children or the elderly being a priority. The reluctance of respondents to be active (involved) in the study could prompt the researcher to adjust the study conditions accordingly. This, however, would pose a risk of bias.

RECOMMENDATIONS FOR ACTION: RESEARCH AGENDA

It should not be ignored that methods and tools for recognising and measuring emotions based on the Facial Action Coding System are gaining popularity (Skiendziel et al., 2019). There are numerous facial expression recognition tools to choose from (Küntzler et al., 2021). Of these, a tool which demonstrates accuracy, especially on standardised, prototypical data, and has a well-established position is FaceReader (Küntzler et al., 2021). The use of FaceReader to recognise customer emotions in scientific research and marketing practice is increasingly common (e.g., Berčík et al., 2025; Hadinejad et al., 2021; Zhang et al., 2021). Like many researchers (e.g., Den Uyl & Van Kuilenburg, 2005; Hadinejad et al., 2021; Landmann, 2023; Lewinski et al., 2014; Skiendziel et al., 2019; Terzis et al., 2013; Zaman & Shrimpton-Smith, 2006), we believe that FaceReader is an effective tool for instant recognition of emotions in various stages of the customer journey. Its application entails the need to develop a study protocol, which would allow for ensuring transparency and quality of the material collected and its subsequent reliable analysis. Landmann (2023) proposed eight key methodological steps of using FaceReader, emphasising that these steps are not complete. Inspired by Landmann (2023), the suggestions by numerous other researchers (e.g., Christensen et al., 2003; Lewinski et al., 2014; Skiendziel et al., 2019) and our own research experience, we developed a description of the conditions for and implementation of a study procedure employing FaceReader.

Focusing on real-time recognition and measurement of customer emotions, we propose five general stages (Discover, Define, Develop, Do and Deliver) for the proper implementation of a study using FaceReader software and the commercialisation of its results (Figure 12.1).

Before designing a study employing FaceReader, the research team or the independent researcher must thoroughly analyse the advisability of using this tool. The key question to be asked is: What is the purpose of the study and what scientific and/or practical problem is it supposed to solve?

Maintaining consistency between the theoretical framework of the study and the research approach adopted, it is important to consider several issues before making a final decision about choosing FaceReader (Stage 1). The first issue pertains to deciding whether the use of FaceReader is relevant to the study. Especially since, just like other types of software, it only allows for

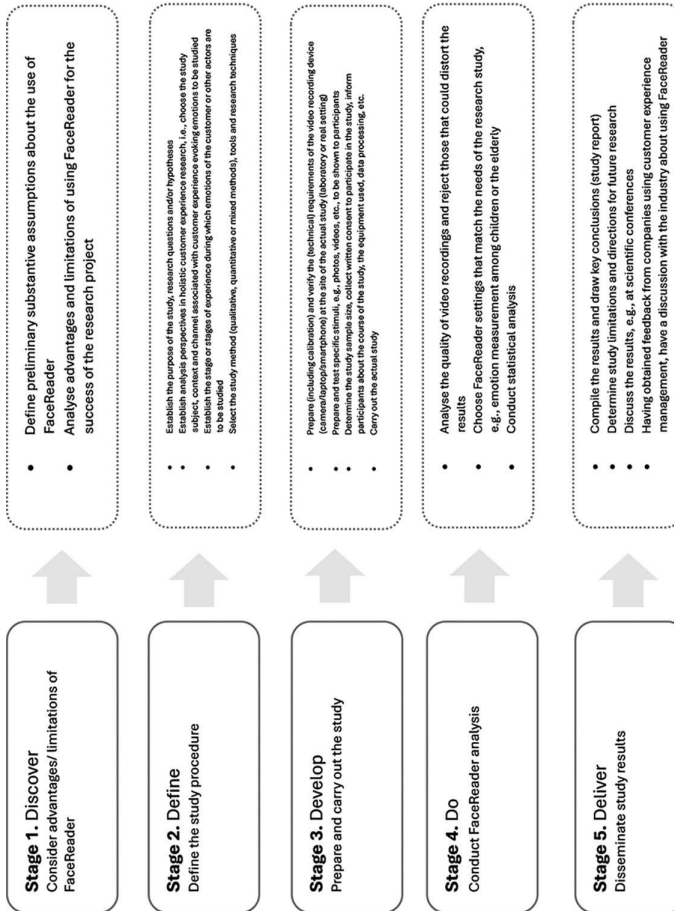


Figure 12.1 Stages of implementing a FaceReader-based study

identifying a limited number of emotions (Tian et al., 2005) and is not necessarily effective with non-standardised data compared to other tools (Küntzler et al., 2021). The second issue is related to considering the potential advantages and limitations of using FaceReader (Table 12.1). FaceReader application is quite time-consuming. Furthermore, in some cases it requires the researcher to have basic statistical knowledge and necessitates training in the use of the software. Nevertheless, FaceReader has several advantages. It allows for

Table 12.1 *Advantages and limitations of using FaceReader software for emotion recognition*

Advantages	Limitations
Identifies six basic emotions* (as described by Ekman), the neutral state and contempt. Detects emotional valence. Confirms emotional arousal. Enables emotional response identification in real time. Traces fluctuations of emotional arousal and pleasure during the experiment. Provides analysis results after each experiment. Analyses data. Allows the researcher to export data in a text format for more detailed analysis. Allows the researcher to compare the results with emotional arousal and survey data.	Sensitive to changes in lighting. Sensitive to thick and dark eyeglass frames. May modify natural reactions of respondents. Depends on visual material quality (minimal image resolution of 640 × 480 pixels). Offers incomplete display if the experiment analysis lasts over a minute. Exports raw data per decision, and the researcher must aggregate and average the data over a 1-second interval. Requires calibration of each respondent’s facial expression; respondents are asked to show a neutral face at the beginning of the experiment. Result interpretation may be limited: • neutral facial expression can be interpreted as sadness; • interpreting participant emotions based on static images can result in lower statistical values for negative emotions; • when participants are focused on the images, their facial expressions can be interpreted as anger; • FaceReader lacks standard parameters such as precision and recall, making it difficult to assess the quality of individual emotion measures. Limited use in measuring emotions of children** and inhabitants of East Asia; exclusion of people with mental disorders.

Note: * happiness, sadness, anger, fear, disgust and surprise (Ekman, 1971; Ekman & Friesen, 1969, 1971); ** Baby FaceReader version 9.0.17 (Noldus, 2022) is dedicated to measuring emotions in children. It has been recognised as an initial support for the automated detection of emotions (Zaharieva et al., 2024).
Source: Compiled on the basis of Geise et al. (2024), Hadinejad et al. (2019a, 2019b, p. 475), Landmann (2023), Skiendziel et al. (2019) and Yu and Ko (2017, p. 104).

reacting to and processing basic emotions, as well as the neutral state and contempt (Landmann, 2023). FaceReader is more sensitive than traditional statement-based measures. Thus, it can detect more subtle emotional reactions that are not free of bias in a laboratory setting (Landmann, 2023; Maison & Pawłowska, 2017).

Detailed features of the software vary depending on the version. It is important to use those versions of FaceReader that allow for extensive analyses, for example, those that include children (Zaharieva et al., 2024).

Having chosen FaceReader as the software for emotion recognition in customer experience, it is necessary to establish the fundamental objective of the study, including the study procedure (Stage 2) that organises the various stages of the research process. Here, it is necessary to determine the stage or stages of customer experience during which video material will be recorded and subsequently used to identify customer emotions. Moreover, it needs to be established whether automated facial expression recognition will be the only method for capturing customer emotions in the research project.

Preparation of a study (Stage 3) employing FaceReader requires addressing several technical issues (e.g., calibration) and preparing an appropriate set of stimuli, that is, videos, photos or a multimedia presentation to be shown to participants. Furthermore, the researcher has to decide whether the study should be conducted in a laboratory setting or, for example, in an actual location where the customer experiences a given service. On the one hand, procedure standardisation is beneficial when collecting data in the form of video recordings necessary for the analysis of emotions using FaceReader (Skiendziel et al., 2019). Therefore, a laboratory setting might be desirable (e.g., Hadinejad et al., 2019a). On the other hand, FaceReader can recognise emotions using respondents' webcams, which is becoming quite a common practice (Lewinski et al., 2014). Both these solutions have their disadvantages and thus require control. While it is possible to better control the quality of video recordings under laboratory conditions, it is difficult to recruit participants for this type of study. The procedure is more time-consuming and expensive. The use of webcams results in better access to participants, but much of the data obtained in this way may require greater involvement of the researcher, who will have to check the quality of the recordings and ultimately remove material that is unfit for further analysis (e.g., Landmann, 2023).

The real, in situ setting may provide greater comfort for participants, which will translate into higher emotion intensity values than during research conducted in an online setting (Brunner-Sperdin et al., 2012; Iván et al., 2019; Liu et al., 2016).

Another aspect to be determined is the function of the researcher during the experiment, that is, the scope of the researcher's interventions and their role as an investigator, an observer or merely an ordering party. The role of

the researcher can be crucial to the success of the study. First and foremost, the investigator should gain the trust of participants and be able to select the study sample. Only people who have given informed consent to participate in the study and do not have any health contraindications, such as mental disorders or a visual defect that prevents observation of the stimuli without glasses, may participate in the study (e.g., Hadinejad et al., 2021; Landmann, 2023). Furthermore, the investigator should be able to explain the procedure in an understandable way, present any technical advice and offer support in case of any problems, such as providing technical assistance or replacement equipment. Maintaining a good researcher/investigator–participant relationship is a typical feature of qualitative research, but due to the sensitivity of the research matter and the experimental nature of the research using FaceReader (Landmann, 2023), it is important to provide comfort and security to participants, for example, in terms of protecting their personal data, including their image.

The interview length is another important issue. Landmann (2023) emphasises that FaceReader settings are customisable so that different levels of results can be provided and used, from very detailed analysis results to descriptive lists of the dominant emotion. Nonetheless, it is important to determine the response time to certain stimuli in advance. Although Landmann states that stimuli do not have to be time-limited, we believe that limited response time (tested in the pilot study) will prevent excessive statements, which in practice translates into deviation from the purpose and subject of the study. Furthermore, the researcher should control the measurement conditions, that is, pay attention to the background, light and position of the participant, as well as the positioning of both the device displaying the stimuli and the device recording the responses. What happens in practice is that participants do not look straight into the camera/laptop/smartphone. The researcher must also be able to react if a respondent, such as an elderly person or someone who wears corrective glasses, does not clearly see the stimuli presented.

Stages 3 and 4 are extremely important, as they require the researcher to ensure methodological rigour. All the descriptions of FaceReader settings and other study conditions and a detailed analysis of the study material will testify to the quality of the study and its reliability.

The analysis of the material collected with the use of FaceReader (Stage 4) is mainly dependent on the video quality. Recordings of poor quality should be removed, as they could distort the results. FaceReader should be set to the general default face model (Skiendziel et al., 2019). In the case of recordings involving people aged 60 and older, the software can be modified to suit the analysis. For instance, it is possible to use the ‘Elderly’ module, that is, the anatomical face model, and adjust the settings for the needs of a given research project.

When analysing data using FaceReader, the researcher or behavioural data analyst first receives information on the gender, age and ethnicity of a given participant. This information can be additionally verified by assigning the recording to an informed consent form for participation in a scientific study, thus obtaining additional information such as the participant's education, place of residence, subjective assessment of their financial standing or employment status. The other data relate to the emotions recognised by FaceReader, which have to be analysed accordingly (Skiendziel et al., 2019).

However, as already mentioned, the researcher (analyst) should have a basic knowledge of statistics, because FaceReader allows data export from the system to statistical software. Thus, it enables individual as well as collective analysis of the research material and the determination of the predominant emotion or the average for all emotions in relation to the context of customer experience. Ultimately, it is possible to compare the results with those obtained in other studies and classify the findings accordingly (Landmann, 2023).

The last stage (Stage 5) requires the researcher to compile the collected results, draw conclusions and identify the limitations of the completed study. The dissemination of research results, for example, in the form of a report, can provide a basis for scientific discussion about the directions for future research using methods and tools for measuring emotions in customer experience. Presenting the report (without the video footage¹) to the industry can provide practical guidance for experience-oriented companies. The feedback received will help to improve the adopted stages of real-time customer experience research and optimise the conditions for FaceReader-based measurement of emotions.

The stages described above may prove useful in conducting scientific research and significantly affect researchers' decisions. However, they are not conclusive. The researcher should rely on accurate and reliable scientific research, observe methodological rigour and adopt a responsible approach to integrating selected scientific theories with the practical needs of consumers and customer experience-oriented companies.

NOTE

1. The analysis and publication of the material should be carried out in such a way as to prevent readers from identifying study participants, for example, by covering participants' eyes or blurring their faces.

Conclusion

Undoubtedly, both researchers and practitioners are increasingly interested in customer experience. It is a key aspect that allows products and services to be shaped in different industry contexts, providing companies and brands with a chance to stand out. However, the knowledge about this concept remains full of contradictions and uncertainties. As we mentioned in Part I, this may stem from a number of reasons. These include terminological and definitional ambiguities. What academics and practitioners agree about is the multidimensional nature of the concept, which comprises, for example, an affective dimension. Affective reactions accompany customers during the decision-making process and consumption, that is, throughout the entire customer journey. Thus, the emotional aspect has to be included in the design and management of a holistic customer experience.

Exploring emotions in customer experience is a difficult and demanding task for researchers. To aptly capture and interpret the role of consumer emotions in a holistic experience, it is necessary to combine the knowledge of emotions with that of consumer behaviour, which partly explains why this line of research has been neglected. Usually, marketing and customer behaviour researchers who want to measure emotions in customer experience have to answer three general questions: (1) what emotions to measure; (2) when to measure them; and (3) how to measure them. Each of these questions is associated with the need to make decisions that will ultimately translate into the design and implementation of a specific research procedure.

This book offers synthetic insights into the dilemma of capturing emotional states in customer experience. We tried to critically analyse methods and techniques to measure and recognise emotions in customer experience research (Part II). The two proof-of-concept research projects we had conducted (Parts III and IV) made it possible to identify various advantages and disadvantages of different approaches to measuring mixed emotions in customer experience. The first study showed that it is possible to use subjective measures to capture mixed emotions in a holistic customer experience. It was carried out with the use of traditional self-report and retrospective (*ex post*) questionnaire-based measures. The second proof-of-concept study used objective measures, that is, it employed FaceReader software which can recognise emotions based on

facial expressions. Linking the existing findings on the advantages and disadvantages of the methods and techniques for measuring emotions with the experience from our proof-of-concept research projects allowed us to gain a deeper understanding of the conditions for the use of these instruments. In both our studies, we adopted a similar theoretical framework (based on Ekman's approach; Ekman, 1971; Ekman & Friesen, 1969, 1971) to operationalise emotions. Thus, our research attempted to measure or identify basic emotions that are either describable based on respondents' subjective answers or identifiable based on their facial expressions. This approach allowed us to focus on the possibilities and limitations of the research procedures used.

Despite the popularity and unquestionable advantages of self-report measures, for example, their simplicity, low cost and potential to simultaneously measure numerous aspects, their limitations prevent the comprehensive measurement of such multifaceted phenomena as customer emotions. Furthermore, these measures do not allow for capturing all dimensions of experience or temporal changes that occur in them. Our research was based on the Customer Experience Quality scale originally developed by Klaus (2015), extended to include items measuring mixed emotions. The addition of items related to basic emotions showed that the Emotions in Customer Experience Questionnaire can simultaneously capture the cognitive and affective dimensions in a holistic customer experience.

Our research showed that respondents, that is, consumers of aesthetic medicine and plastic surgery services, experienced mixed emotions in every stage of the experience and that their emotions changed as they moved from one stage to the next. However, we also demonstrated that retrospective measurement does not fully reflect the diversity of emotions experienced by customers. These are merely subjective, conscious emotions, which hinder complete identification of the affective dimension of responses to specific stimuli and touchpoints. Furthermore, the ambiguity of the results leaves room for a discussion regarding the accuracy of the emotional operationalisation we adopted, prompting the conclusion that the selection of a consumer emotion list may be contextual in nature. The development of scales based on a different set of mixed emotions may contribute to fragmented findings, or be criticised by practitioners looking for general, universal and context-neutral advice on designing and managing a holistic customer experience. Yet, this is a relatively straightforward task.

In contrast, incorporating a different set of emotions into emotion recognition research based on facial expressions seems much more complicated and difficult. Facial expression analysis is a promising technique for recognising and measuring emotions in customer experience (in a covert and unobtrusive manner). It is one of the neurophysiological measures that are being tested in capturing emotions in customer experience. These measures offer

an alternative to subjective methods. However, their application raises questions, particularly related to the limitations of automated emotion recognition. Our study, which employed FaceReader version 8.1, showed that spa service customers (health tourists) experienced mixed emotions. Apart from the positive (i.e., happiness) and negative emotions (i.e., sadness, anger, surprise, fear, disgust and contempt), they also experienced the neutral state. These emotions were triggered upon contact with specific stimuli (touchpoints), which provides clues as to which components of the service (or more broadly, the offer) evoke specific emotional states. However, this particular study design does not provide information on the unique emotions that contribute to the final evaluation of the experience. Furthermore, a study designed in this way is time- and resource-consuming. It requires strict control of the study conditions, which is characteristic of experimental procedures and aimed at ensuring the highest possible quality of the stimulus and the material to be analysed. In addition, as already mentioned, the software used limits the number of emotions that can be recognised.

Our proof-of-concept research projects confirmed the validity of using subjective and objective measures to explore emotions in a holistic customer experience. At the same time, they clearly showed that each of these method types measures a different aspect of emotions in a different stage of the customer journey. Thus, to fully capture the complexity of this issue, it seems justified to attempt to develop standards for combining the available research methods and techniques for measuring and analysing emotions in customer experience. The mixed-method approach not only allows for employing methods derived from various research traditions, but also for addressing different components of emotions. The combination of data collection methods within the mixed-method approach facilitates leveraging the strengths of subjective and objective measures, while minimising their drawbacks and data bias. This, however, requires a discussion on methodological rigour, which serves as the basis for research outcome evaluation. There is a need to discuss standards in numerous areas, for example, sampling principles, which are now mutually exclusive when compared with the recommendations for selecting respondents to questionnaire-based research versus neurophysiological research. Another issue is the reliability and principles of reporting results of studies carried out with commercial software. In other words, the attempts to develop a standard for the mixed-method approach to measuring emotions in a holistic customer experience should refer to theories of psychology, knowledge of marketing and consumer behaviour and consumer neuroscience.

Another dilemma stemming from our findings involves the contextualisation of consumer experience. In both of our proof-of-concept research projects, we considered the context of experience, based on the dual, hedonic and utilitarian orientation of health and well-being services. This approach,

on the one hand, deepens knowledge about the role of emotions in the service context but, on the other, limits the possibility of generalising conclusions. In addition to the tourism and hospitality context that dominates in customer experience research, it is worth confirming the findings by referring to other industry contexts, those less represented in the literature and those resulting from the development of sales channels, for example, the hybrid (phygital) setting. Combining physical, human and digital elements can create different customer experiences and lead to irrational consumer behaviours. This way of offering products and services creates new tasks for customer experience researchers, which involve the appropriate mapping of physical and digital touchpoints in the entire consumer journey and, subsequently, deciding which methods and tools to use in the phygital setting to perform a reliable measurement of emotions in a holistic customer experience.

In conclusion, marketing and consumer behaviour researchers and practitioners are still uncertain how to create effective strategies of managing holistic customer experiences and the emotions associated with them. It is still not entirely clear what methods and tools should be used by researchers and practitioners to design and manage a holistic customer experience. Finally, it is not exactly determined what knowledge and skills practitioners should have in order to select the most appropriate methods, tools and techniques for designing and managing customer experience. In this book, we discussed the methods and techniques used to measure and recognise emotions in customer experience research. However, this discussion is not conclusive. The complex nature of emotions and their diversity, as well as the multidisciplinary nature of customer experience research, create the need to develop and elaborate a methodology that would allow for a holistic approach to these issues.

Appendices

APPENDIX 1

Have you used aesthetic medicine and/or plastic surgery services in private clinics/offices in the preceding 12 months?

[one answer]

☐ Yes

☐ No → end of the study

Part 1. Experience BEFORE your stay in a private aesthetic medicine and/or plastic surgery clinic

Section 1a

Please think about the moment you decided to choose the private aesthetic medicine and/or plastic surgery clinic where you had your last treatment. What were your expectations?

Please rate the following statements on a scale from 1 to 7, where 1 – “strongly disagree”, 2 – “disagree”, 3 – “slightly disagree”, 4 – “neutral”, 5 – “lightly agree”, 6 – “agree”, 7 – “strongly agree”.

[one answer per statement]

Before my last visit to the clinic, I was convinced that							
CLINIC has a good reputation	1	2	3	4	5	6	7
CLINIC personnel have extensive expertise	1	2	3	4	5	6	7
I can consult the personnel about treatment plan that will best suit my needs	1	2	3	4	5	6	7
It is worth choosing CLINIC not because of the attractive price alone	1	2	3	4	5	6	7
The personnel are high-calibre professionals who care about CLINIC's reputation	1	2	3	4	5	6	7
CLINIC's services have the best quality	1	2	3	4	5	6	7
CLINIC's offerings are superior	1	2	3	4	5	6	7
CLINIC can be contacted in various ways (telephone, online, etc.)	1	2	3	4	5	6	7

Section 1b

Now, think about the emotions you experienced when you made your choice of the clinic.

Please rate the following statements on a scale from 1 to 7, where 1 – “never”, 2 – “very rarely”, 3 – “rarely”, 4 – “sometimes”, 5 – “often”, 6 – “very often”, 7 – “always”.

[one answer per statement]

Before my last visit to the clinic, I felt ...							
Happiness	1	2	3	4	5	6	7
Sadness	1	2	3	4	5	6	7
Anger	1	2	3	4	5	6	7
Surprise	1	2	3	4	5	6	7
Fear	1	2	3	4	5	6	7
Disgust	1	2	3	4	5	6	7

Figure A1.1 Emotions in Customer Experience Questionnaire – Part 1

Part 2. Experience DURING your stay in a private aesthetic medicine and/or plastic surgery clinic.**Section 2a**

Please think about the time when you last stayed in the private aesthetic medicine and/or plastic surgery clinic and were provided with the service. What was your impression?

Please rate the following statements on a scale from 1 to 7, where 1 – “strongly disagree”, 2 – “disagree”, 3 – “slightly disagree”, 4 – “neutral”, 5 – “lightly agree”, 6 – “agree”, 7 – “strongly agree”.

[one answer per statement]

During the last visit to the clinic							
The personnel advised me throughout the treatment process	1	2	3	4	5	6	7
Dealing with CLINIC (going through the formalities) is easy	1	2	3	4	5	6	7
The personnel always kept me informed	1	2	3	4	5	6	7
The personnel demonstrated flexibility in addressing my needs	1	2	3	4	5	6	7
The personnel demonstrated empathy and care towards the patient	1	2	3	4	5	6	7
I always dealt with the same procedures and/or same personnel	1	2	3	4	5	6	7
The personnel related to my wishes and concerns	1	2	3	4	5	6	7
The personnel communicated with me very well	1	2	3	4	5	6	7
CLINIC delivered a good customer service	1	2	3	4	5	6	7
I have built a good relationship with the personnel	1	2	3	4	5	6	7
CLINIC's infrastructure and facilities are better designed to fulfil my needs than their competitors	1	2	3	4	5	6	7
CLINIC's facilities are designed to be as accessible as possible	1	2	3	4	5	6	7

Section 2b

Now, think about the emotions you experienced during your stay in the private aesthetic medicine and/or plastic surgery clinic.

Please rate the following statements on a scale from 1 to 7, where 1 – “never”, 2 – “very rarely”, 3 – “rarely”, 4 – “sometimes”, 5 – “often”, 6 – “very often”, 7 – “always”.

[one answer per statement]

During my last visit to the clinic, I felt ...							
Happiness	1	2	3	4	5	6	7
Sadness	1	2	3	4	5	6	7
Anger	1	2	3	4	5	6	7
Surprise	1	2	3	4	5	6	7
Fear	1	2	3	4	5	6	7
Disgust	1	2	3	4	5	6	7

Figure A1.2 Emotions in Customer Experience Questionnaire – Part 2

Part 3. Experience AFTER your stay in a private aesthetic medicine and/or plastic surgery clinic.

Section 3a
Please share your opinion on the private aesthetic medicine and/or plastic surgery clinic whose services you recently used. What do you think about it now that you have had the treatment/surgery?
Please rate the following statements on a scale from 1 to 7, where 1 – “strongly disagree”, 2 – “disagree”, 3 – “slightly disagree”, 4 – “neutral”, 5 – “lightly agree”, 6 – “agree”, 7 – “strongly agree”.

[one answer per statement]

Given my last experience at the clinic, I think that							
I will choose CLINIC again because they know my treatment history	1	2	3	4	5	6	7
The personnel know exactly what I need	1	2	3	4	5	6	7
CLINIC keeps me up-to-date about their new offerings and latest developments	1	2	3	4	5	6	7
I will come back to CLINIC if need be	1	2	3	4	5	6	7
CLINIC dealt well with me, even when things went wrong	1	2	3	4	5	6	7
I am happy with my choice of CLINIC	1	2	3	4	5	6	7
My peers appreciate CLINIC I chose	1	2	3	4	5	6	7

Section 3b
What emotions do you feel now when you think about the private aesthetic medicine and/or plastic surgery clinic whose services you recently used (item ... x1)?
Please rate the following statements on a scale from 1 to 7, where 1 – “never”, 2 – “very rarely”, 3 – “rarely”, 4 – “sometimes”, 5 – “often”, 6 – “very often”, 7 – “always”.

[one answer per statement]

After my last visit to the clinic, I feel ...							
Happiness	1	2	3	4	5	6	7
Sadness	1	2	3	4	5	6	7
Anger	1	2	3	4	5	6	7
Surprise	1	2	3	4	5	6	7
Fear	1	2	3	4	5	6	7
Disgust	1	2	3	4	5	6	7

Figure A1.3 Emotions in Customer Experience Questionnaire – Part 3

APPENDIX 2

I hereby confirm that:

1. I am a person of legal age and I am not completely incapacitated.
☐ YES
☐ NO
2. I have been informed by the researchers about the research study planned, *The role of emotions in the experience of customers of spa enterprises in Poland*, and in particular about its assumptions, objectives, methods and procedures and the anticipated benefits and risks associated with participation in this study, and I confirm that I have received and understood oral information intended for participants in this research study.
☐ YES
☐ NO
3. I have received satisfactory answers to all the questions I asked and understand all the information provided to me regarding this research study.
☐ YES
☐ NO
4. I have been informed that participation in the study is free of charge and entirely voluntary.
☐ YES
☐ NO
5. I have been informed that I can withdraw from this study at any time without giving any reason and my decision will not entail any penalties or loss of rights to which I am otherwise entitled.
☐ YES
☐ NO
6. I have been informed that if I have any questions or concerns during the study, I can address them to the persons indicated in the information given to me.
☐ YES
☐ NO
7. I voluntarily agree to participate in the research study titled *The role of emotions in the experience of customers of spa enterprises in Poland*.
☐ YES
☐ NO
8. I consent to the processing of my personal data related to my participation in this study by the principal investigator and other persons conducting this study to the extent indicated in the information for research participants, in accordance with the Data Protection Act of the 10th of May 2018.
☐ YES
☐ NO

.....
 Date entered by participant

.....
 Signature of participant

.....
 Date entered by researcher

.....
 Signature of researcher

*Figure A2.1 Informed Consent Form for Participants in a Research Study
 – Part 1*

Research participant data:**Gender** ☐ Female ☐ Male**Age** [please indicate how old you are]**Education** ☐ higher ☐ secondary ☐ vocational ☐ primary/lower secondary**Place of permanent residence**☐ village☐ town ≤ 50,000 inhabitants☐ city 51,000-100,000 inhabitants☐ city 101,000-500,000 inhabitants☐ city > 500,000 inhabitants**Are you currently employed?** ☐ yes ☐ no** if not, please indicate your current status☐ pupil/student ☐ retiree/health pensioner ☐ unemployed**Financial standing**☐ very poor☐ poor☐ hard to say☐ good☐ very good**Number of visits to the Spa Resort**☐ first time☐ 2nd–3rd time☐ > 3 times**Source of information about the Spa Resort**☐ National Health Fund (NFZ) physician☐ family/friends☐ I've known this Spa Resort for a long time☐ websites and/or social media (e.g., Facebook)☐ mass media (TV, radio, press)☐ other, please specify**Source of funding for your stay at the Spa Resort**☐ NFZ, ZUS, other☐ own funds

Figure A2.2 *Informed Consent Form for Participants in a Research Study*
— Part 2

APPENDIX 3

Facial expression analysis	Particip ant 1	Particip ant 2	Particip ant 3	Particip ant 4	Particip ant 5	Particip ant 6	Particip ant 7	Particip ant 8	Particip ant 9	Particip ant 10	Particip ant 11	Particip ant 12	Particip ant 13	Particip ant 14	Particip ant 15
Valence	-0.2320	-0.2389	-0.0575	-0.0665	-0.1764	0.0351	-0.0684	-0.1588	-0.2575	0.0175	-0.0096	-0.0309	-0.0185	-0.1153	-0.0135
Emotional arousal (%)	25.12	33.98	27.09	27.71	27.97	26.23	42.54	31.95	22.56	32.97	32.34	35.30	30.90	36.32	31.85
Neutral state (%)	52.31	53.89	64.43	54.10	43.95	58.51	56.80	52.03	60.03	46.23	80.85	58.07	91.40	39.31	93.95
Emotional expressions (%) Happiness	0.45	0.88	1.65	1.00	0.50	10.93	2.91	1.56	0.17	14.29	3.04	4.16	1.39	2.92	2.67
Emotional expressions (%) Sadness	4.58	4.05	1.82	2.11	1.53	2.34	2.67	4.62	1.17	10.44	0.85	0.82	0.17	11.10	3.72
Emotional expressions (%) Anger	0.83	0.13	0.91	3.59	3.49	2.85	4.82	1.42	0.07	1.08	1.14	0.14	1.64	0.29	0.16
Emotional expressions (%) Surprise	1.35	3.17	1.35	0.69	0.75	1.90	11.99	0.43	1.03	2.84	2.53	5.39	0.47	10.38	0.06
Emotional expressions (%) Fear	0.74	20.56	1.88	0.32	2.57	3.09	1.69	2.40	0.38	1.25	1.03	0.13	0.56	4.65	0.18
Emotional expressions (%) Disgust	19.56	0.89	5.06	3.50	13.71	2.25	2.26	12.49	25.43	1.15	1.94	6.76	1.46	0.30	0.37
Emotional expressions (%) Contempt	0.23	0.40	0.42	0.31	0.21	0.19	1.68	0.40	0.09	1.40	1.70	0.22	0.06	0.72	2.85

Figure A3.1 Characteristics of emotional expressions in each participant from Spa hospital A

Facial expression analysis	Particip ant 16	Particip ant 17	Particip ant 18	Particip ant 19	Particip ant 20	Particip ant 21	Particip ant 22	Particip ant 23	Particip ant 24	Particip ant 25	Particip ant 26	Particip ant 27	Particip ant 28	Particip ant 29	Particip ant 30
Valence	0.0737	-0.2588	0.0923	0.0100	-0.0373	-0.0468	-0.0485	0.0667	0.0347	0.0375	-0.0984	-0.0587	-0.0213	-0.0076	-0.0037
Emotional arousal (%)	17.11	21.67	36.56	32.05	26.81	34.58	39.34	30.62	33.46	40.89	33.34	37.28	41.25	31.01	26.32
Neutral state (%)	49.90	52.60	70.77	83.06	82.86	89.67	69.23	76.90	67.58	64.30	80.20	57.52	78.39	86.19	99.68
Emotional expressions (%) Happiness	16.67	1.66	13.34	3.78	3.15	1.20	4.55	9.09	6.40	10.65	1.58	1.82	1.76	1.34	0.00
Emotional expressions (%) Sadness	7.87	0.90	2.21	0.62	2.69	1.56	1.37	1.23	0.39	3.38	4.69	0.57	0.84	0.36	0.11
Emotional expressions (%) Anger	1.67	21.93	2.56	1.04	0.49	0.11	6.86	0.97	1.46	2.94	0.39	1.71	0.03	0.75	0.27
Emotional expressions (%) Surprise	0.78	0.21	0.10	1.23	0.15	0.55	0.13	3.13	2.64	1.16	0.58	1.98	1.48	1.42	0.07
Emotional expressions (%) Fear	0.15	0.11	0.01	0.23	0.06	0.01	1.38	0.21	0.48	0.90	0.10	5.84	0.63	0.46	0.13
Emotional expressions (%) Disgust	1.23	6.98	0.72	1.72	5.21	4.82	1.18	0.69	1.68	0.53	8.16	0.48	2.80	0.98	0.00
Emotional expressions (%) Contempt	0.14	0.30	0.35	0.29	0.23	0.05	0.27	0.17	0.06	0.40	0.42	0.26	0.10	0.14	0.04

Figure A3.2 Characteristics of emotional expressions in each participant from Spa hospital B

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