Convenience and Emotions through Facial Expressions: Evidence from Online Medication Shopping Behavior

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ABSTRACT

Convenience is a crucial factor for e-commerce websites and is closely linked to our emotions as the evaluation of the comfort and ease of shopping. However, the emotional component is insufficiently explored in studies. This study aims to extend existing knowledge about the relationship between search convenience, as the main component of online shopping convenience, and emotions in addition to predictors of search convenience in a specific purchase situation: using online pharmacies. Participants' emotion elicitation in terms of emotion valence (positive-negative) and emotion intensity in terms of convenience is theoretically determined using the appraisal theory of emotions and methodologically by automated facial expression analysis (FaceReader). In a combination of observational and self-report data, the relationships between predictors and emotions on search convenience are calculated using partial least squares structural equation modeling.

The results show that a comprehensible product arrangement positively influences search convenience, and familiar navigation structures from online stores increase search convenience, whereas knowledge from brick-and-mortar pharmacies does not. As search convenience increased, the intensity of positive emotions decreased, consistent with the theoretical emotional perception of convenience. From these findings for search convenience in the use of online pharmacies, the theoretical and methodical implications are discussed.

Keywords: Emotions, E-Pharmacy, Convenience, Facial Expressions, Medication Retail, FACS

Declaration of conflict of interest

The authors confirm that there are no known conflicts of interest associated with this publication and there has been no financial support for this work that could have influenced its outcome.

Ethics Information

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INTRODUCTION

As consumers are now more concerned over time management than ever, they particularly appreciate the benefits of online shopping. These benefits include the availability of service at all times, a wide range of products, high discounts, and far greater convenience than in offline retail (Beauchamp and Ponder 2010; Jiang et al. 2013; Kaura et al. 2015; Kumar et al. 2020). Today, customers expect the benefits of e-commerce to be available in the healthcare sector (Tang et al. 2019), and pharmacies are one of the most important healthcare providers for the public in this sector. In Addition to customers' expectations, the decreasing number of brick-and-mortar pharmacies (BMPs) (Hatemi and Zorn 08.03.2020) and the COVID-19 pandemic pushed people towards online shopping (Carolyn Wickware April 2021; Bhatti et al. 2020). Moreover, the increasing proportion of the elderly in the population, and the growth of chronic diseases, have also led to the growth of the online pharmacy (OP) market (ABDA – Bundesvereinigung Deutscher Apothekerverbände e. V. 2021; Bhatti et al. 2020; Fortune Business Insights 2019). In general, online pharmacies have been permitted in Germany since 2004, and the market is quite young but thriving, especially in the field of OTC medications (Albrecht et al. 2020). Globally, sales in this area have been increasing in double digits in recent years and sales are predicted to rise (Statista 2022). Additionally, the rate of switching from prescription medication to OTC drugs increased (Wieringa et al. 2015; Research and Markets 2021). The main shopping drivers of online pharmacies are service quality, anonymity, promotions, and most importantly convenience (Pramuk 2020).

Convenience aims to reduce time and effort (Reith 2007; Khalifa and Limayem 2003) and increase comfort (Spake et al. 2011). It is well-established that purchase decisions, customer satisfaction, and repurchase intention are influenced by convenience (e.g., Lloyd et al. 2014; Aghili and Dehdashti Shahrokh 2015; Djan and Rubbiah Adawiyyah 2020; Pham et al. 2018). In addition to the general convenience in online shopping of being able to reach different retailers at one click and have the purchase delivered to your home, providing search convenience through navigation structures is an important factor for the success of online retail businesses (Jiang et al. 2013). Several studies underlined that website navigation contributes to satisfaction, trust, and loyalty (e.g., Cyr 2008; Duarte et al. 2018; Palacios and Jun 2020), depends on familiar structures (Jayawardhena et al. 2007), and influences the behavioral intention to use the website (e.g., Hausman and Siekpe 2009; Nurdianasari and Indriani 2021). For the specific case of OPs, where the importance of finding the right product is particularly high because these are products that have the goal of curing or preventing a disease, it is not yet known which structures contribute to the search convenience of OPs. Search convenience can be partly determined by persistent structures of the environment, such as navigational structures, which can be cognitively evaluated, but convenience also implies a feeling of comfort (Broeder and Gkogka 2020; Usman and Prihastomo 2020; Tuch et al. 2009; Esch and Thelen 1997). Thus, the concept is intertwined with emotions represented by comfort as a feeling. Therefore, convenience as an essential success factor of online stores cannot be holistically evaluated without considering its emotional component.

In consumer studies, emotions are considered a crucial factor in explaining behavioral outcomes in several aspects, including purchase intention, approach behavior, and satisfaction (e.g., Sherman et al. 1997; Machleit and Eroglu 2000; Williams 2014). In relation to online shopping and human-computer interaction, emotions have been the main focus to investigate concepts such as attitude towards the website, ease of use, usability, and design aspects (e.g., Deng and Poole 2010; Hassenzahl et al. 2010; Porat and Tractinsky 2012; Coursaris and van Osch 2016), convenience has been scarcely investigated especially with its emotional component.

In the context of online customer behavior, it is acknowledged that nonverbal communication is an important channel for understanding (e.g., Jokinen 2015; Liliana and Basaruddin 2018; Hernández-Fernández et al. 2019). In nonverbal communication, facial expression analysis is one of the most productive means of capturing customer emotions (Ekman 1993; Reisenzein et al. 2014; Hwang and Matsumoto 2016). However, research on facial expressions as manifestations of emotions when using e-commerce websites has rarely gone beyond their design and usability (e.g., Staiano et al. 2012; Yu and Ko 2017) and has paid little attention to real-life phenomena that do not elicit strong emotional responses, as is the case with online shopping for medications. The few studies on convenience that have examined emotions have reported that positive emotions are associated with convenience (Bagdare 2014; Hidayat and Satria 2020), among them, only one study is found that used facial expression analysis (Goldberg 2012).

These studies primarily analyzed valence (positive or negative) but not the intensity of emotion, although this is one of the main dimensions of emotion that is reflected in the face that can provide important insights into a customer's unconscious approach or avoidance decisions when shopping (Anderson and Sobel 2003; Hamann 2003).

This study aims to extend the knowledge gathered so far in consumer research on the concept of convenience in online environments by analyzing customers' immediate emotions reflected on their faces while searching for non-prescription medications in the four selected OPs. The goal is to determine whether and how the emotions evoked by the convenience experienced while purchasing medications are reflected in the face, and furthermore, to identify navigational and classification structures that influence search convenience in OPs. To achieve the above goal, customers' faces were recorded during the use of the OPs and the emotions that appeared on the faces were analyzed using automated facial expression analysis (AFEA). Participant self-reports were used to measure search convenience and determine its predictors. Appraisal theories of emotion have been empleyed to explain how emotions may arise from medication seeking. Partial least square structural equation modeling (PLS-SEM) was used to assess how emotion and cognition influence each other.

The remainder of this study is organized as follows. Section 2 sheds light on shopping for hance the qua;medication, emotions, and the concept of convenience. Section 3 explains the theoretical background of the study, which is the appraisal theory of emotion, and describes the hypotheses. Section 4 explains the methods used in the study, and Section 5 presents the results. Lastly, we discuss the findings in Section 6 and present the conclusion in Section 7.

1. BACKGROUND

1.1 SHOPPING EXPERIENCE, EMOTIONS, AND CONVENIENCE

The shopping experience is created through the environment, the product, and their interaction with the customer. Additionally, consumers' response to the situation is derived from subjective preferences, beliefs, and feelings, which form their judgments and interact with the stimuli. Experience, even when externally stimulated, is a result of individual production depending on those involved (Addis and Holbrook 2001; Carù and Cova 2003). Customers' cognitive and emotional states can be stimulated through product display or sensory stimuli, which refers to the amount of detail or intricacy in visual stimuli, as visual complexity (Jang et al. 2018). It is empirically shown that visual complexity affects the attention, information processing rate, and affective status of the consumers (Deng and Poole 2010; Tuch et al. 2009). Customers' need for activation by stimuli and their response to the visual complexity depends on their shopping goals (Deng and Poole 2010). For example, in fashion stores, customers can tend to browse around and spend time shopping without a specific goal. In this case, shopping can have a hedonic character, and it is observed that customers welcome the visual complexity (Jang et al. 2018).

In contrast, in health-related shopping, it may be assumed that since the customers wish to regain health without delay, they wish to buy the products quickly and effortlessly. The customers are goal-oriented and display shopping of a utilitarian character (Babin et al. 1994). In such cases, utilitarian shopping appeals to the rationality of customers and induces their intellectual buy-in of the shopping experience (Liu et al. 2020). The task of purchasing medication can be described as goal-oriented, serious-minded, and future-oriented (Apter 2001), in these cases, store environments that are less arousing and less complex are preferred (Kaltcheva and Weitz 2006; Deng and Poole 2010). A study on goal-oriented online shopping revealed that approach intention increases with increasing webpage orders, leading to higher pleasure (positive affect) (Deng and Poole 2010). The webpage order refers to clear, logical, and coherent content presentation on web pages to reduce the cognitive load during the shopping process. The cognitive load influences the emotional response (Deng and Poole 2010; Handa and Gupta 2014). Therefore, the ease in the shopping process is related to the ease of information finding, processing, and the time-saving properties of the process. Most importantly, when purchasing health-related and even vital goods, customers may require information about the product, the application area, the effect, and usage. In BMPs, information is usually tailored to the consumers' needs through the pharmacist's advice. OPs lack pharmaceutical staff, and information about medication, some of which is of vital importance, must be obtained in other ways. This calls for an extra effort to

obtain the information, which adds to the effort invested in shopping and causes the customer to cancel the process (Beauchamp and Ponder 2010). That's why OPs need to create structures with their website design that makes it quick and easy to find the products desired. This links us to the concept of convenience.

1.2 CONVENIENCE IN ONLINE SHOPPING

Customers' use of resources of time and effort are described as non-monetary costs that influence shopping behavior (Berry et al. 2002). While shopping, customers spend time on various tasks, such as selecting a retailer, searching for product information, locating the desired product, comparing products, and, finally, checking out (Beauchamp and Ponder 2010). In online shopping, time and effort are spent mainly selecting a web shop, navigating the website, finding and comparing the product, retrieving information, and finally waiting for the products to be delivered (Jiang et al. 2013).

These purchase processes give rise to the multidimensional concept of convenience, of which two main components are emphasized in shopping: Saving time and money (Yale and Venkatesh 1986; Berry et al. 2002; Wolfinbarger and Gilly 2003; Seiders et al. 2007). In online shopping, there are several dimensions of convenience found, such as access, search, evaluation, transaction, and post-purchase convenience (Jiang et al. 2013). These dimensions cover the whole purchasing process and follow a chronological order. Among them, search convenience (SC), which includes the ease of navigating a website, the speed of getting to the desired products, and the comprehensible product classification, has been found to be the critical component of convenience in online shopping (Jiang et al. 2013).

In particular, non-monetary costs determine convenience in online shopping. Following this line of reasoning, Reith (2007) considers emotional and cognitive costs when considering convenience. Experiential elements of convenience are customers' feelings or psychological comfort in interacting with the environment while shopping (Reith 2007; Dalmoro et al. 2019). Convenience as an emotional response is expressed in terms of "comfort," "relaxed," and "feel good" (Russell 1980; Vink and Hallbeck 2012; Dalmoro et al. 2019). Here, comfort can be defined as "a pleasant state or relaxed feeling of a person in response to his or her environment" (Vink and Hallbeck 2012, p. 271).

The importance of the non-monetary costs of online shopping underlines the importance of SC, especially for the purchase of medications, which follow a utilitarian motive and emphasize finding the appropriate product due to its importance for a person's well-being and health. We define SC as the quick and easy identification and selection of desired products.

To explain the interplay between emotion and cognition, we will explain how SC ratings can evoke emotions in the next chapter.

2. CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Emotions are ubiquitous - as Picard (2003: 56) points out, "it is common to hear somebody say, "Sorry, I wasn't thinking", but not "Sorry, I wasn't feeling". Nevertheless, it is difficult for both experts and laypeople to describe what is meant by the word "emotion".

Naturally, in daily lives, people constantly observe and interpret the behavior of others as mental and emotional states (Reisenzein et al. 2014). In social interactions, we are confronted with expressions of emotions through intricate combinations of verbal and nonverbal information (James 1884; Ekman and Friesen 1976; Darwin and Prodger 1998). Expressing emotion through postures, gestures, movements, vocal displays, and/or facial displays is a part of human nature and served a surviving function in the evolution of humanity. This explains why humans have emotions, and addresses, among other things, their beneficial consequences of them (Darwin and Prodger 1998).

Function-related consequences are described to be patterns that evolved via evolutionary processes, socialization, and cultural values (Keltner and Gross 1999). As a result, emotions seem to be related to physiological responses in the human body and further serve a function in terms of adapting one's behavior to the given by the environment (James 1884) with its social and physical cues and can therefore be based upon specific causes and consequences (LeDoux 2012).

Criticism on this approach has been frequently raised for ignoring the mental or cognitive element that elicits the physiological responses (Wundt 1891; Cannon 1927). In early conceptualizations, emotion was viewed as separate and even antithetical to cognition (Izard 1993). Contemporary research has largely dismantled the separation between cognition and emotion (Clore and Huntsinger 2007). It has been established through experiments that the inability to use emotional information caused by brain damage resulted in profoundly negative consequences for judgment and decision-making faculties (Damasio 1994). Therefore, it is acknowledged across disciplines that cognition and emotion complement rather than contradict each other (Clore and Palmer 2009; de Sousa Pernes 2015).

Having explained why emotions came to exist in the first place, the question arises: what makes an emotion an emotion?

Basically, emotions have to be distinguished from mood, which is longer-lasting and a more comprehensive emotional state, and from affect, an umbrella term for emotion and mood (Eder and Brosch 2017). Thereby emotions are described to arise quickly, having a short duration, being more focused and intense, and having the power to disrupt an activity (Lazarus 1991). Emotions are tightly linked to behaviors and decision-making (Damasio 1994). Nevertheless, what are emotions?

There are numerous definitions of emotion (Plutchik 1991; Izard 2010). Kleinginna and Kleinginna (1981: 385) defined emotion as:

"[…] a complex set of interactions among subjective and objective factors, mediated by neural/hormonal systems, which can (a) give rise to affective experiences, such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes, such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate widespread physiological adjustments to the arousing conditions; and (d) lead to behavior that is often, but not always, expressive, goal-directed, and adaptive."

Combining the characteristics and functions of emotion, we draw on the notion that emotional processes are elicited and dynamically patterned as the individual, continuous appraisals of objects, situations, behaviors, and events.

Appraisal theories explain that the emergence of emotions is triggered by stimuli and reflected by the different systems mentioned in the definition (Moors et al. 2013). These theories have been successfully applied in several studies to obtain richer insights into user experience (e.g., Saariluomaand and Jokinen 2014; Jokinen 2015).

2.1 APPRAISAL THEORY OF EMOTION APPLIED TO SHOPPING IN ONLINE PHARMACIES

Appraisals are viewed as cognitive mechanisms that cause subjective judgments, which in turn cause or constitute emotions (Moors et al. 2013; Moors et al. 2021). For emotions to emerge, multiple components interact in disorganized, continuous, recursive, and reciprocal ways (Moors et al. 2013). The appraisal process begins when a situation or stimulus is recognized as significant to the person (Frijda 1986).

The main component of the emotion elicitation process is the *appraisal component*. It addresses environmental interactions by appraising the interaction between the environment and the person-environment. Other components include a *motivational component* representing the tendency or willingness to act, a *somatic component* with peripheral physiological responses, a *feeling component* expressing subjective experience, and a *motor component* corresponding to instrumental and expressive behavior (Frijda 1986; Scherer 2005; Moors et al. 2013).

The appraisals that take place are based on a set of variables. Scholars largely agree that *goal relevance, goal congruence, certainty, coping potential/control, and agency/cause* are the core variables of the appraisal process (Moors et al. 2021). A special role is attributed to one's own well-being in the appraisal process. Well-being includes one's own needs, values, attachments, goals, and beliefs (Frijda 1986; Lazarus 1991; Scherer 2005).

Reaching back to purchasing medication online, a person uses an OP to find and buy certain medications to achieve their goals (goal-relevance): Medication is to be purchased as a cure for illness or to maintain health, which highlights the significance of the OP and the medication for one's own well-being. The fulfillment of personal needs and current goals is addressed, and appraisals begin to work. Searching for products and evaluating the website

tackles the dimensions of certainty (Will the medication help?), congruence (Do I identify/find the desired/precise medication in the OP?), and coping potential/control (Will it be delivered in time?). Finding the medication depends on the products' presentation, such as through classification, and the OP's navigation and search functions. Thus, the dimensions of SC are addressed during the purchase.

In addition to the above-mentioned factors, identifying the appropriate medication depends also on the implications of being sure about the medication's application or process of use and effects. Finally, the coping potential and control are tested when irritations occur due to the website's functioning or presentation of the medication, which also heavily depends on (in)convenience. All variables combine to produce emotions that can be manifested by the *somatic component*, such as fluctuations in the heart rate. The *feeling component* can be reported verbally, such as the feeling of convenience, and the *motor component*, which comprises facial expressions.

Having clarified how emotions can emerge when convenience is appraised during the search for the medication in an OP, the next question arises: How can emotions be measured as a motor component of appraisal theory?

2.2 FACIAL EXPRESSIONS AS COMPONENT OF EMOTIONS

Facial expression is one of the most powerful, natural, and universal signals that human beings, irrespective of their nationality, race, or gender, use to communicate their emotional states and intentions (Darwin and Prodger 1998). Of the total emotional feedback, 55% is visible on the face (Ekman 1999; Reisenzein et al. 2014) and is difficult to suppress or blur to meet social expectations because facial expressions manifest unconsciously (Winkielman and Berridge 2004; Winkielman et al. 2005). Facial expressions are the best-discriminating non-verbal channel of emotions (Reisenzein et al. 2014). For determining facial expressions, Ekman and Friesen proposed a Facial Action Coding System based on the fact that facial expressions result from natural and transient changes in facial features (Ekman et al. 2002). During the last decades, computer-assisted and more advanced methods have been developed for automatic emotion recognition (Bayrakdar et al. 2016). Although the potential area for the application of these methods is wide, their application is still scarce. In some studies, computer-assisted methods have been used to investigate product categories, such as film clips and food, that evoke, known emotional responses. However, only a few have used the methods to study products with unknown emotional effects and, therefore, evocative of unexpected facial expressions. So far, few studies are available on facial expressions as situational emotions to understand and predict consumer behavior (Clark 2020; Danner and Duerrschmid 2018). For example, Balzarotti et al. (2014) examined facial expression changes in Avatar-Human interactions during computer use. The results revealed that, for internet exploration where the interaction level was low, emotions were scarcely reflected in the face (Balzarotti et al. 2014). In summary, the existing AFEA studies have measured the number of discrete emotions or the change in emotional valence (Ahn et al. 2008; Balzarotti et al. 2014; Hernández-Fernández et al. 2019), but have ignored another dimension of emotions that can significantly be impacted by perceptions of convenience: the intensities of emotions. The findings in the field of neuroscience show that emotional response and stimulus evaluation may primarily be characterized by two dimensions: valence and intensity (Anderson and Sobel 2003; Hamann 2003), which might have the highest relevance for facial expressions of emotion produced by the anterior neural processes (Sander et al. 2005; Sander et al. 2018; Scherer 2005). Based on current research, we can state that shopping environments can condition emotional arousal (Deng and Poole 2010; Kaltcheva and Weitz 2006; Usman and Prihastomo 2020) and that, consequently, interpreting the intensity of facial expressions depending on convenience perceptions is reasonable.

2.3 HYPOTHESES

As mentioned earlier, usability depends on the ease of navigating the website, which can be influenced by existing knowledge from previous experiences. Studies have shown that new information is compared to existing knowledge when completing tasks. In their study, Jayawardhena et al. (2007) showed that navigating in-store and online is very similar. In addition, eye-tracking studies demonstrate that people expect objects to be in a specific location on different types of websites (online stores, online newspapers, and corporate websites) and find these objects more easily in the expected locations. Compared to unfamiliar or unexpected placements, few eye fixations were required

when the object was found in the expected location, suggesting ease of search (Roth et al. 2013). Sensitivity to site typicality varied by object type and site (Papachristos and Avouris 2013). In general, knowledge and familiarity with purchasing medications can be acquired through experience with BMPs or OPs in Germany. For the specific case of OPs, with OTC medications as products sold exclusively in pharmacies in Germany (due to German law §17 ApoBetrO), navigational behavior in BMPs (navigation in BMP) and OPs (navigation in OP) can potentially contribute to the ease and comfort of finding desired products and thus SC.

In addition, the conditions for fast and effortless navigation must be met. For this, the layout of the website, visual complexity, and the arrangement of the products play a decisive role in quickly finding the desired products (Deng and Poole 2010; Broeder and Gkogka 2020). *Product classification* refers to the possibilities of arranging products according to product and category characteristics. Basically, product classification creates the clarity and logic for orientation and navigation in the OP. Therefore, we assume that product classification is an additional predictor for SC.

Furthermore, considering the main convenience components, including the time-saving component, the *search length* in the shopping process was estimated as an objective variable by observation. Although this variable does not represent time savings, since time spent is measured, plausible considerations suggest that there is a relationship between search length and SC.

In the given shopping situation, it can be claimed that internal evaluations of convenience occurring without intent are reflected in facial expressions immediately and cannot be easily suppressed (Ekman et al. 1991). Very few studies that used facial expressions as a motor component of convenience appraisals were found. Goldberg (2012), examined the connection between the perceived web page complexity and emotional valence using AFEA (FaceReader 3.0). Results revealed that with decreasing web page complexity, positive emotional valence increased (Goldberg 2012). With web page complexity, the author also addressed the amount of content and service options available on a website. In this study, the products' classification indicates webpage complexity and the alternatives for navigating through the store (e.g., search bar and product proposals) to the desired product as the service offered by the site. Since these are descriptors of SC, Goldberg's findings have been considered in this study.

Furthermore, few investigations have measured convenience emotions via self-reports. Hidayat and Satria (2020) studied the effect of convenience on emotional valence in a mobile commerce environment to test similar hypotheses. Their findings show a positive relationship between convenience and positive emotions (Hidayat and Satria 2020). Additionally, a study on task performance and the user's emotional experience while using office applications including internet browsers showed that successful coping, which is indicative of an appraisal variable of emotion theory, is reflected in positive feelings (Jokinen 2015).

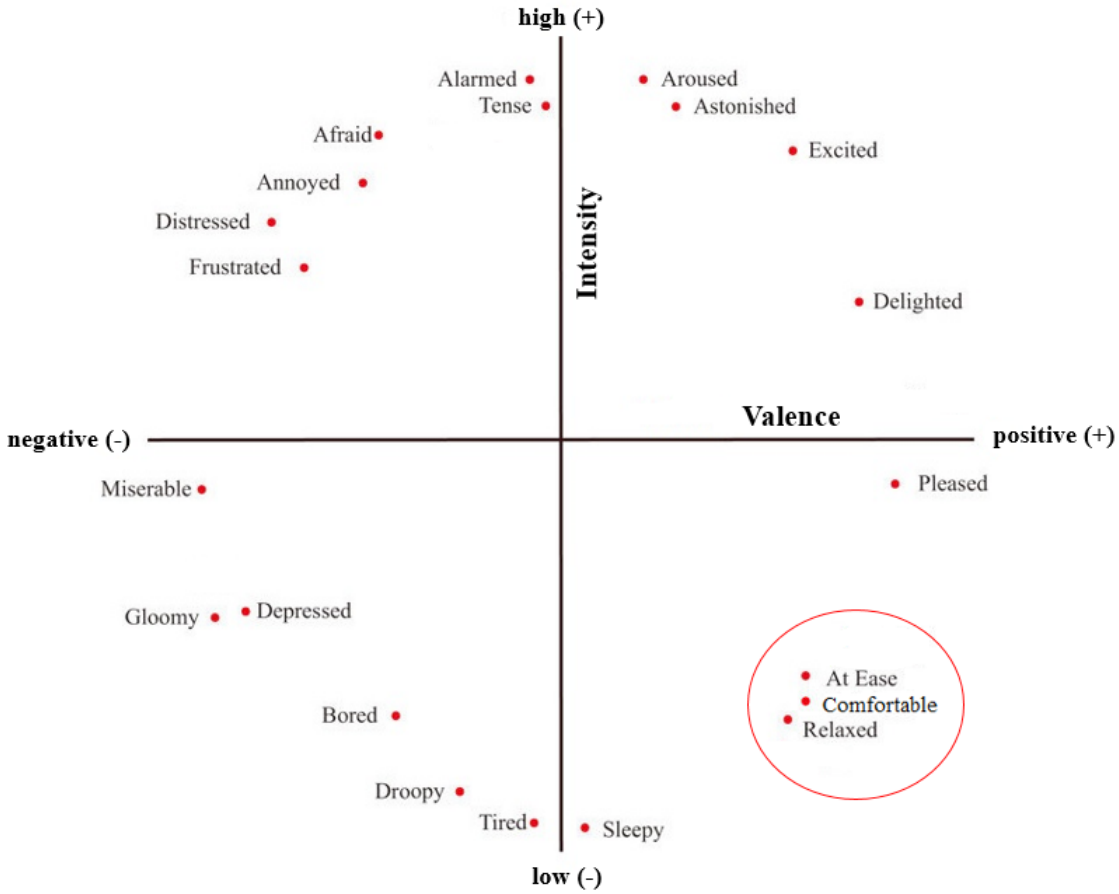
Overall, these investigations report that convenience or related constructs affect positive emotions while their support for other dimensions of emotion is not reported. This might be attributable to the problem in solely measuring emotions via self-reports. Since effortless and fast shopping by definition indicates low interaction with the website, we did not use the frequency of emotions because the study by Balzarotti et al. (2014) showed that the frequency of emotions in such tasks is very low.

Figure 1 below presents a two-dimensional view of emotions. The valence of emotions decided according to AFEA's distinction between positive and negative emotions is plotted along the X axis. The high or low levels of activation (intensity) are plotted along the Y axis. At the fixed positive valence for convenience-related emotions, and changeable activation levels, we choose the emotion words of convenience to be "comfortable", "relaxed", and "at ease", all of which are examples of a low level of intensity according to well-known dimensional theories of emotion (e.g., Mehrabian and Russell 1974; Russell 1980; Watson and Tellegen 1985; Plutchik 1991). Since the purchase of medication is of utilitarian character, it is presumed that consumers prefer less arousing shopping environments. Therefore, the level of emotional activation is low, and, so are the intensities of emotions that are reflected in the consumers' faces.

We assumed that a high SC relies on a comfortable, relaxed, or at ease, and less exciting, arousing, or emotionally activating shopping experience, which is reflected in the face subsequently as a positive emotion of low intensity. Therefore, we posit the following hypothesis:

H_1: High perceived search convenience *will be reflected in the* ***low intensity of positive emotion on the user's face****.*

FIGURE 1:
TWO-DIMENSIONAL MODEL OF EMOTIONS



(*Note: Red circled field highlights convenience emotions. This model is derived from the models of Watson and Tellegen (1985), Mehrabian and Russel (1974) and Russel (1980))*

Another study of relevance was performed by Gast 2018), who explored how irritations during the purchase of wine in an online store influence customers' facial expressions. The irritations were due to, among other causes, popups, non-functioning voucher codes, and unclear product classifications. Gast (2018) analyzed facial expressions by manual coding (EmFACS). The results revealed that irritations caused the unintentional lengthening of the ordering process which increased negative emotions (Gast 2018). Irritations in the ordering process are particularly relevant during the navigation on the website because pauses can occur when one is finding one's way to the product. Thus, interruptions can lead to inconvenience during the search and cause irritations in the search pattern. Similarly, caused delays in process of buying medications are interruptions in the search pattern and thus an inconvenience. From a theoretical perspective, time-saving is an incremental component of convenience. Therefore, we hypothesize that as perceived SC decreases time spent in the OP increases.

H_2: Low perceived search convenience *will be reflected in* ***high search length****.*

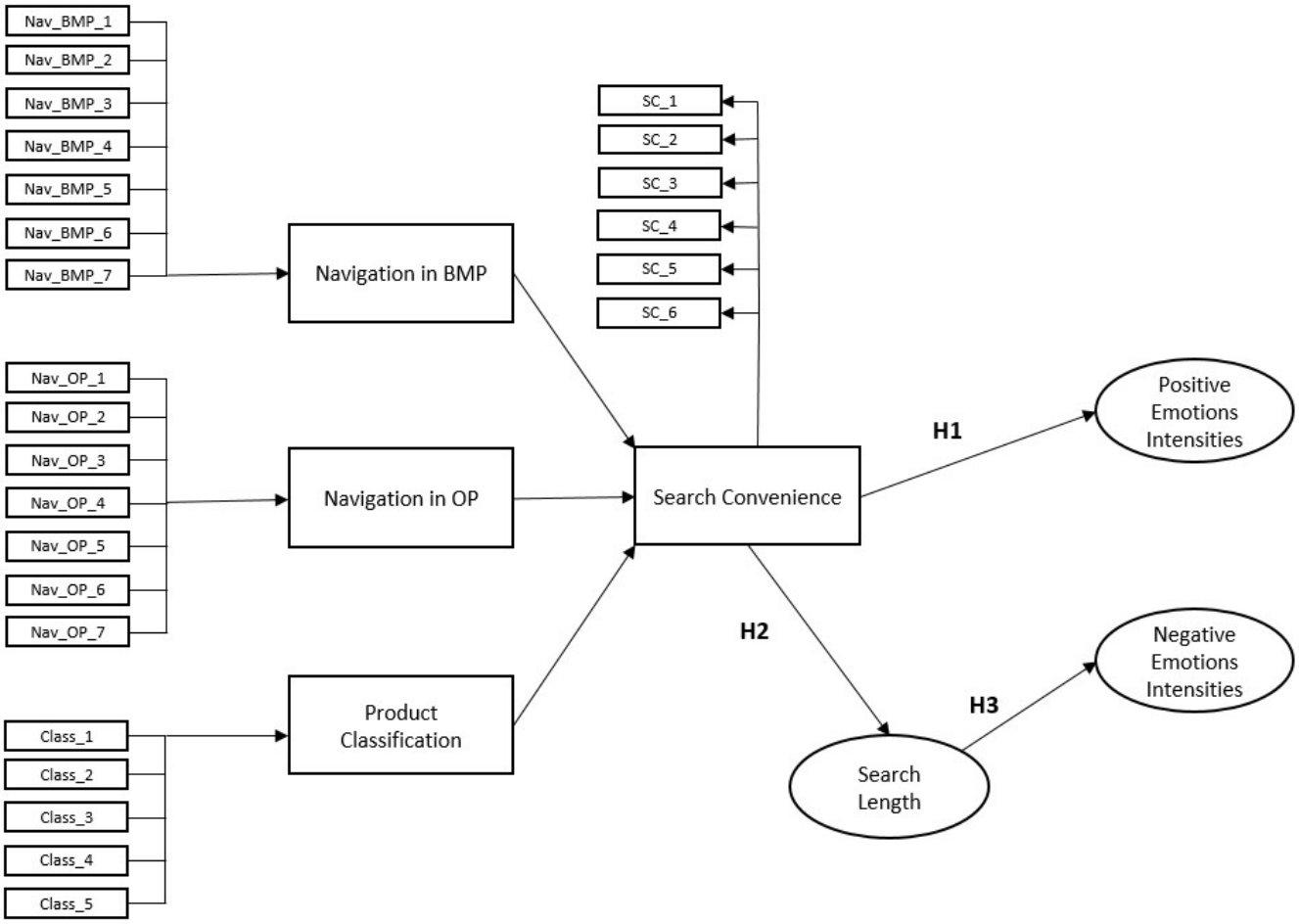
When customers experience interruptions in their search, they feel irritation, which compels them to take unplanned actions to overcome the interruptions and soothe the irritation (Gast 2018). These actions can be cognitive, behavioral, and emotional. Consequentially, actions to overcome interruptions, soothe irritations, and achieve the shopping goals can heighten the activation, excitement, arousal of emotions. Irritations are negative emotions and rise in intensity as the time spent on the website increases (Jokinen 2015; Gast 2018). We assume that the levels of intensity of

negative emotion are reflected in in the subject's face. This is emphasized by the two-dimensional view of emotions presented in Figure 1. Therefore, we hypothesize that with increasing search length the intensity of negative emotion will increase. Accordingly, we hypothesize the following:

H_3: High search length *will be reflected in the* ***high intensity of negative emotion on the user's face****.*

Based on these considerations and hypotheses, we build the research model (Figure 2).

FIGURE 2:
RESEARCH MODEL ON EMOTIONS AND CONVENIENCE.



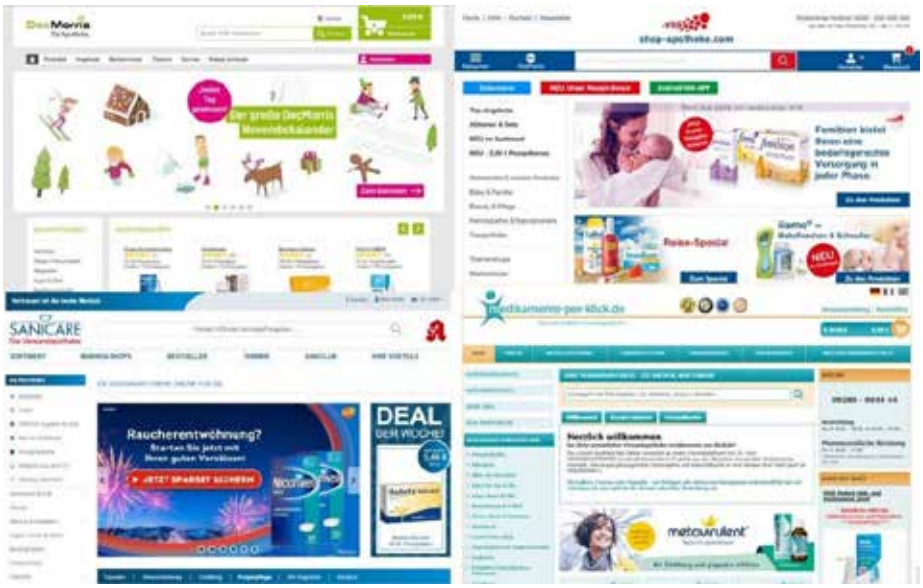
(Note: Survey data are indicated as rectangles, observational data as ellipses)

3. METHOD

3.1 STIMULI

Four online operating pharmacies were selected for the study. These were, Docmorris, Sanicare, Medikamente per Klick, and Shop Apotheke (Figure 3). In 2015, these pharmacies had reported the highest sales in Germany's medicines and healthcare products segment (EHI Retail Institute 2016). The study was conducted in May and June 2017. Participants were asked to search for two OTC medications in one of the four pharmacies—first, a specific product (either WALA Euphrasia Eye Drops 30 x 0,5 ml, Lioran 30 St. Hard capsules, or Fenihydrocort 0.25% Cream 20 g), and second, any OTC medication that they were familiar with for treating the common cold. The pharmacies being tested were randomized. By specifying the product and letting the subjects look for one product of their own choice, we aimed to ensure that as diverse search paths as possible could be used in the OPs.

FIGURE 3:
TESTED ONLINE PHARMACIES



3.2 STUDY DESIGN

The study was carried out at the participants' homes, offices, or other quiet places. The prime criterion was that the participant must be alone while performing the search. First, the participants were introduced to the study, and the instructions and their written consent to participate were obtained before the study procedure was begun.

Preparations. The web browser (Firefox) was prepared for every participant on the researcher's laptop after deleting all bookmarks and emptying cache files. Then, a hotkey for the screen recorder was set to start and end the recording. The software was configured to record the participant's face and the screen and assemble both videos into one, with the webcam recording at the bottom right inserted into the video, and the screen recording at 80 percent opacity.

A between-subject design was selected for the study and consisted of three tasks.

First Task: Participants were handed the first questionnaire with the mood survey, a free-response field for the second *known OTC product* against cold, and the names of the three *OTC products*. After answering the mood survey and choosing the products, the participants were seated in front of the laptops and the web browser was opened with the randomly chosen OP. Finally, before being left alone in the room by the author, the participants were instructed how to start and stop recording.

Second Task: The participant started the recording with the start of the search. The search task was completed when both products were added to the shopping cart and then the recording stopped.

Third Task: After they finished their search task, the participants were handed a questionnaire. At first, again their mood was queried, followed by their *familiarity* and *shopping frequency* for BMPs, *online shopping (OS), OPs in general*, and the *tested OP*. The second *navigation* in BMP and OP, followed by *product classification*, and *SC* were surveyed on a 7-point Likert scale with the anchor points "strongly agree = 7" and "strongly disagree = 1", and "0 = don't know" as an escape option. Finally, demographic details were asked. The scales for navigation in BMP and OP contained 7 items and were formed from actual orientation points of BMPs and of Ops and the product classification scale, which was derived from 5 items according to actual classification options of the OPs. The *SC* scale contained 6 items and was developed following Jiang et al.'s (2013) and Beauchamp and Ponder's (2010) scale.

3.3 SAMPLE

The study took place in Germany. The participants in the study were students and volunteers recruited by students from the local university of the authors in exchange for credit points. Exclusion criteria were medical or pharmaceutical education and age under 18 years. Convenience sampling was used to select the participants, which is an efficient and acceptable sampling method to adopt for online shopping, as demonstrated in previous studies (Park and Kim 2003; Carlson and O'Cass 2010; Kumar et al. 2020).

Usable videos and questionnaires were obtained from 155 participants. The gender distribution was almost balanced, with 46.5% male and 53.5% female subjects. The respondents were mostly young, 63.2% of participants were younger than 26 years; (mean age = 29.6 years; minimum = 18, maximum = 67). The largest percentage of participants tested the Docmorris (32.9%) website, followed by the websites of Medikamente per Klick (27.7%), Shop Apotheke (21.9%), and Sanicare (17.4%), see Table 1). Most of the participants (74.2%) had never visited the tested OPs and were unfamiliar with them, while 82.6% had not shopped on the websites before. Most participants regularly purchased other products online (95.5%) and visited online websites at least 1–3 times per year (97.4%). However, only 21.9% of the participants purchased OTC medicines from OPs, and 60% had not visited OP websites. Most of the participants purchased OTC medications in BMPs regularly and at least 1–3 times a year (96.8%). For an overview of this data, see Annex 1.

It is not claimed that the sample is representative. However, the surveyed sample included those who used online shopping and, therefore, were familiar with the use of shopping websites, product search, and the convenience of online shopping.

TABLE 1:
DEMOGRAPHICS

	n	%
Gender		
Male	72	46.5
Female	83	53.5
Age		
18–20	28	18.1
21–25	70	45.2
26–40	22	14.2
41–60	32	20.6
61–67	3	1.9
Participants per OP		
Docmorris	51	32.9
Sanicare	27	17.4
Shop-Apotheke	34	21.9
Medikamente-per-Klick	43	27.7

3.4 AUTOMATED FACIAL EXPRESSION ANALYSIS

FaceReader Version 8.0 was used to conduct the analyses. The approach was based on the understanding of facial anatomy. FaceReader was developed based on FACS (Ekman et al. 2002). The observable facial muscle movements were thereby classified according to a dictionary/taxonomy, and the collective recognition of the movements was used for interpreting facial gestures as emotions (Ekman and Friesen 1978; Reisenzein et al. 2014; Hwang and Matsumoto 2016). FaceReader can detect seven emotional states: happy, neutral, sad, angry, disgust, surprise, and contempt. Additionally, the dimensional categorization of emotions was provided according to the circumplex model of affect created by Russell (1980). The analysis followed four steps:

1. *Face Finding*. The face was detected using the Viola-Jones algorithm.
2. *Modeling*. By applying the Active Appearance Method (AAM), over 500 key points of each face were used to model a 3D mask of each face.
3. *Classification*. Using a trained artificial neural network, the expression is aligned and classified.
4. *Deep Face Classification*. A direct classification of the image pixels was conducted to enhance the accuracy of the analysis. Even when AAM works insufficiently, such as in the cases where parts of the face are hidden, an analysis is carried out. Another advantage of AAM does not need to be calibrated to start the analysis (Loijens et al. 2018; Loijens and Krips 2019).

The video recordings of the participants were analyzed with the face model "general," which fits most people (Loijens et al. 2018). The analyses were run frame-by-frame and in the maximum accuracy mode (slow) to estimate the best model fit. Besides the frequency of the facial expressions, the maximum intensities for the seven types of facial expressions were scored over time. The range of intensity was set between 0 and 1. Due to the quick onset and brief duration of emotions in milliseconds, using average intensities is not reasonable, therefore, maximum intensity values are used (Danner and Duerrschmid 2018). The states angry, sad, scared, and disgusted were used to form the composite construct of negative emotions and happiness for positive emotions. Since surprise can be positive or negative in valence and contempt is a computed combination of anger and disgust (Loijens and Krips 2019), it had already been considered in the construct of negative emotions and, therefore, these emotions were excluded.

3.5 METHODOLOGY

Partial Least Squares (PLS) structural equation modeling (SEM) is typically seen as an alternative to Covariance-based (CB) SEM and is referred to as the variance-based estimation of models (Hair et al. 2011). The method uses the total variance and estimates parameters by combining principal component analysis with ordinary least squares regressions (Hair et al. 2019).

PLS-SEM has several advantages over the typically restricted CB-SEM (Hair et al. 2011), such as it can deal with complex structural models including many constructs, indicators, and relationships. While using PLS-SEM, data distribution is not a concern since PLS-SEM can deal with the lack of normality, and formatively measured constructs can be estimated with it (Hair et al. 2019).

In this work, the use of PLS was preferred because of the following considerations: i) observational data combined with self-reports was being used, ii) emergent and latent variables were considered, and iii) data was partially normally distributed (Cassel et al. 2000; Hair et al. 2017; González-Rodríguez et al. 2020).

PLS is primarily employed to test the hypothesized model because it can deal with two kinds of constructs: emergent variables and latent variables (Hair et al. 2017). Latent variables are concepts measured by a reflective measurement model, while emergent variables are composite constructs emerging from their indicators and are consequently assessed formatively. In this model, SC was measured reflectively and the other constructs (Navigation in BMP, Navigation in OP, Product Classification) formatively (see Figure 2). PLS-SEM estimates reflective measurement models with Mode A (correlations weights) and formative measurement models with Mode B (regression weights). To estimate the algorithm estimation, the following parameters were set: 300 iterations, stop criterion $10^{-7,}$ and replacing

the missing values with the average values. To test the significance of the path coefficients, the bias-corrected and accelerated (BCa) bootstrapping procedure was applied with 5000 samples and a two-tailed significance level of .05 (Hair et al. 2017).

Since four pharmacies were tested, a preliminary analysis was necessary to determine whether group differences existed between the four pharmacies model calculations could be performed. This was accomplished by calculating univariate ANCOVAs (univariate analysis of covariance). If differences existed, group-dependent calculations were performed to estimate the predictors for low and high convenient pharmacies and test the hypotheses. If none existed, the model calculation was performed for all pharmacies together.

4. RESULTS

4.1 FIRST STAGE ANALYSIS

Self-reported results were analyzed for differences in perceived SC using univariate analysis of covariance (ANCOVA). The construct *SC* as the dependent variable was estimated with the factor of *online pharmacy* adjusted with the variables *mood before use* and *familiarity* (BMPs, OS, OPs, and tested OPs) as covariates. There was no significant effect for the OPs and the SC ($F(3,83) = .702$, $p = .554$, $\eta^2p = .025$). Greater *familiarity with online shopping* was significantly related to greater perceived *SC*, ($F(1,83) = 5{,}507$, $p = .021$, $\eta^2p = .062$). The other covariates were not significantly related to SC. Furthermore, we conducted correlations of constructs, see Table 2.

Search convenience was rated high with $M = 5.34$, $SD = 1.23$ above the scale mean of 4. Familiarity with OPs in general ($M = 1.46$, $SD = .73$) and with the certain used OP ($M = 1.31$, $SD = .65$) was rated in the low range of the scale, while familiarity with BMP was rated slightly below moderate ($M = 2.79$, $SD = .82$), and familiarity with OS was rated moderate ($M = 3.75$, $SD = .92$).

As is known, individuals can inherently carry a mood (e.g., Watson and Tellegen 1985). Moods are emotions that persist for some time and lack a clear antecedent (Eder and Brosch 2017). They were proven in other studies to impact situation-based emotions and cognitive evaluations (Srull 1983; Gardner and Vandersteel 1984; Forgas and Bower 1987; Clore et al. 1994). To evaluate the possible effects of participants' mood on the interaction task and self-reports, we surveyed the mood before and after using the OPs to adjust means if needed. No significant interaction effects between mood before use and OPs were found ($F(3,148) = .874$, $p = .456$, $\eta^2p \leq .017$, Wilk's $\lambda \leq .983$). Additionally, the mood of the participants did not differ significantly across the tested online pharmacies. Thus, mood as a possible confounding effect is present equally across all interactions and need not be considered further.

Drawing on the presented results, which showed no differences between the OPs with control for mood, and familiarity, we considered all cases together to test the hypotheses and the model formulated via PLS-SEM.

TABLE 2:
CONSTRUCT CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13
Search Convenience (1)	-	.244*	n.s.	.536**	n.s.	n.s.	.258*	n.s.	n.s.	n.s.	n.s.	.247*	n.s.
Navigation in BMP (2)	.244*	-	.440**	.439**	n.s.	n.s.	n.s.	.172*	n.s.	n.s.	n.s.	.168*	n.s.
Navigation in OP (3)	n.s.	.440**	-	.373**	.191*	.258**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Product Classification (4)	.536**	.439**	.373**	-	n.s.	n.s.	n.s.	.233*	n.s.	n.s.	n.s.	n.s.	n.s.
Familiarity with OP (5)	n.s.	n.s.	.191*	n.s.	-	.809**	.218**	.191*	n.s.	-.173*	n.s.	n.s.	n.s.
Familiarity with tested OP (6)	n.s.	n.s.	.258**	n.s.	.809**	-	.178*	.206*	n.s.	-.190*	n.s.	n.s.	n.s.
Familiarity with OS (7)	.258*	n.s.	n.s.	n.s.	.218**	.178*	-	n.s.	n.s.	n.s.	n.s.	n.s.	-.164*
Familiarity with BMP (8)	n.s.	.172*	n.s.	.233*	.191*	.206*	n.s.	-	n.s.	n.s.	n.s.	n.s.	.196*
Negative Emotion Intensities (9)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-	.233**	n.s.	-.194*	.331**
Positive Emotion Intensities (10)	n.s.	n.s.	n.s.	n.s.	-.173*	-.190*	n.s.	n.s.	.233**	-	n.s.	n.s.	.271**
Mood before Use (11)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-	.895**	n.s.
Mood after Use (12)	.247*	.168*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.194*	- n.s.	.895**	-	n.s.
Search Length (13)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.164*	.196*	.331**	.271**	n.s.	n.s.	-

*(Note: Pearson's Correlation; * $p \leq 0.05$, ** $p \leq 0.01$ (two-tailed), n.s. = not significant)*

4.2 PLS-SEM ANALYSIS

4.2.1 Measurement Model

To assess the measurement models, different criteria were adopted to evaluate the quality. For reflective measures, composite reliability (Dijkstra–Henseler's ρ), discriminant validity, and average variance extracted (AVE) were computed, and the variance inflation factor (VIF) and regression weight and loading were calculated for the formative measures. For *reflective measures,* a value of Dijkstra–Henseler's ρ (the correlation between the latent variable and construct scores) larger than 0.707 was regarded as reasonable, if more than 50% of the variance in the construct scores was explained by the latent variable (Nunnally 1994). The AVE, typically used to assess convergent validity, indicates to what extent the latent variable can explain the indicators' variance. An AVE larger than 0.5, it has been suggested, provides empirical evidence of convergent validity as the corresponding latent variable explains more than half of the variance in its indicators. Consequently, all other latent variables explain less than half of the variance (Hair et al. 2017).

The composite models with *formative measures* require the estimation of multicollinearity by utilizing the VIF, while values above five are regarded as indications of problematic multicollinearity (Hair et al. 2017). Weights and loadings are assessed to estimate the contribution of an indicator to its construct. Loadings represent the correlation between the indicator and the corresponding emergent variable as the absolute contribution, while weights represent the relative contribution. Here, both parameters, weights, and loadings, are essential for the estimate the aforementioned correlation and contribution. Nevertheless, if the parameters do not meet the requirements, dropping an indicator should be well considered because the meaning of the emergent variable can change accordingly. Therefore, scholars often decide to keep an indicator with non-significant weight and loading to preserve the construct's content validity (Esposito Vinzi et al. 2010; Henseler et al. 2016; Hair et al. 2018; Benitez et al. 2020).

The listed criteria were all met by the reflective measures. Though some non-significant items were detected (see Annex 2) during formative measurements, these items were retained in consideration of the existing orientation marks in BMPs and OPs that customers could use. Also, excluding an item might change the meaning of the construct, and evaluating the constructs as composites of items would no longer be appropriate.

TABLE 3:
ESTIMATION OF THE STRUCTURAL MODEL WITH HYPOTHESES TEST

Relationship	Path coefficient	p	f2	Result
Navigation BMP →Search Convenience	.114	.068	.021	
Navigation OP →Search Convenience	.213	.002	.064	
Product Classification →Search Convenience	.520	<.001	.400	
Search Convenience → Positive Emotions Intensities (H1)	-.169	.028	.029	H1 supported
Search Convenience → Search Length (H2)	-.057	.506		H2 rejected
Search Length → Negative Emotions Intensities (H3)	.257*	.006	.071	H3 supported

4.2.2 Structural Model Estimation

First, we estimated the PLS algorithm and subsequently applied the bootstrap method to test the established hypotheses and estimate relationships among constructs. The results are presented in Table 3 above.

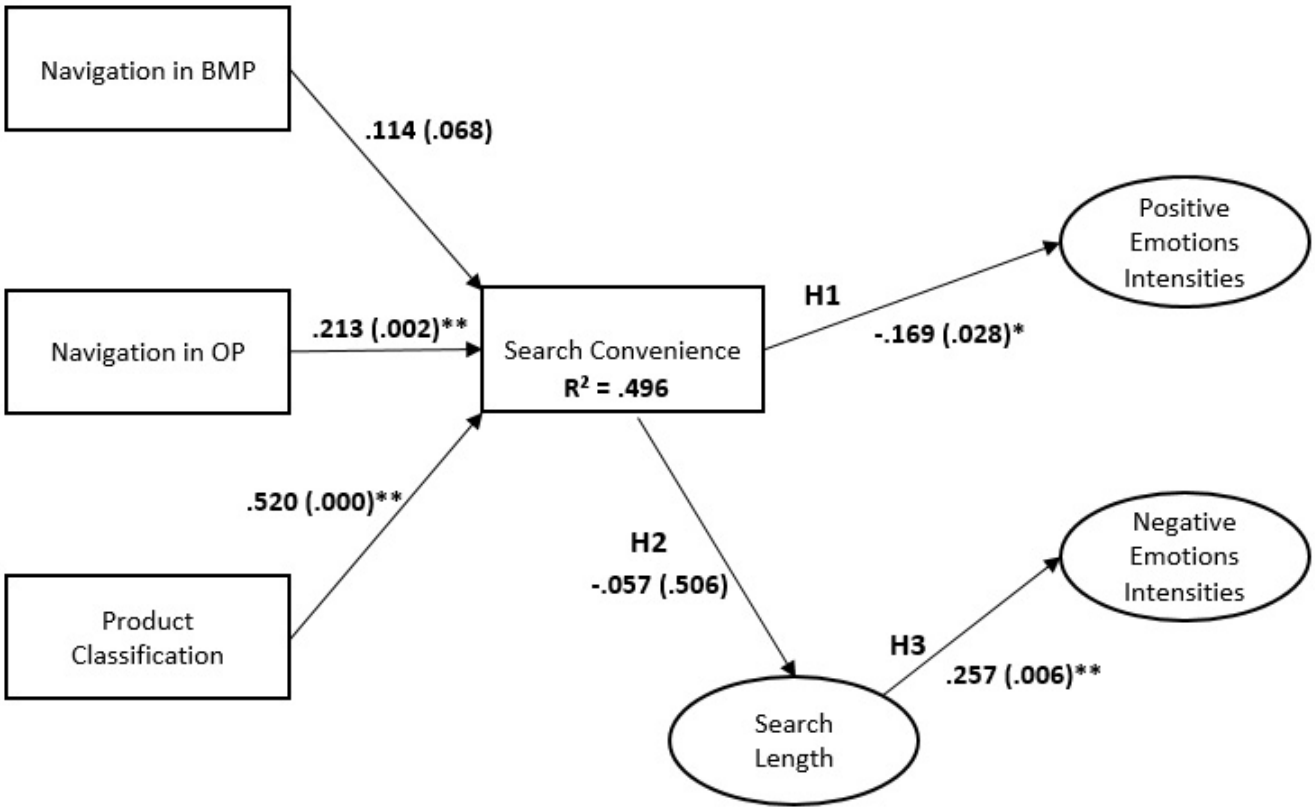
Since our model is more exploratory than confirmatory in nature, path coefficients and their significance levels are more relevant in the models' evaluation than the model fit (Benitez et al. 2020). Scholars have debated about accurate model-fit measures for PLS-SEM with emergent indicators, but so far, there is no suitable measure for overall fit (Henseler et al. 2016; Hair et al. 2019; Benitez et al. 2020).

We found significant relations between SC and positive emotions (H1), navigation in OP and SC, product classification and SC, and the search length and negative emotions. Hypotheses 1 and 3 were supported and hypothesis 2 was rejected. Further, we also considered the effect sizes (f^2) to interpret the effects of independent constructs on dependent ones. The f^2 values showed weak effects between SC and positive emotions (f^2 = .029), search length and negative emotions (f^2 = .071), and navigation in OP and SC (f^2 = .064). Based on Cohen's (1988) thresholds, a large effect was estimated for product classification and SC (f^2 = .400).

Moreover, we evaluated the degree of variance (R^2) to be .496 (R^2 = .496) for the main construct SC. The expected magnitude of R^2 in a study depends on how well the phenomenon under investigation has already been investigated and understood, that is, on the "status quo" of research. The fewer the existing studies, the lower the R^2 because the phenomenon requires considerable further research and explanation (Benitez et al. 2020). In this case, we explored the phenomenon of SC in OPs to gain a deeper understanding. The investigated exogenous constructs navigation in BMP, navigation in OP, and product classification were largely unexplored for OPs. To the best of our knowledge, the existing research deals only with other areas of e-commerce. In this study, the so-far rarely used combination

of observational data and self-reports has been used. Therefore, the exploratory characteristics of this study are significant. For this reason, and because of the similarity of the interpretation of results drawn from this study with that of the results from other studies (Benitez et al. 2020), the value of R^2 estimated at 49.6% is considered satisfactory in marketing research (Hair et al. 2017). The results of the structural model estimation are represented in Figure 4.

FIGURE 4:
RESULTS OF THE STRUCTURAL MODEL ESTIMATION.



*(Note: path coefficients and p values in brackets, * p ≤ 0.05, ** p ≤ 0.01 (two-tailed))*

5. DISCUSSION

This study aimed to investigate convenience in online pharmacies in order to 1) identify predictors of the main component of convenience in online shopping, search convenience, and 2) explain search convenience with its emotional component via situational emotional valences and intensities. Therefore, this study examined search convenience when purchasing over-the-counter medications from four online pharmacies.

The interplay of emotion and cognition regarding perceived convenience in the course of human-computer interaction was embedded in the appraisal theory of emotion to derive theoretical considerations on which to base the hypotheses.

In the conceptual model (see Figure 2), self-reported data and observational data were combined and constructs were used with formative and reflective indicators. That is one of the strengths of this method because the predictors for convenience in the survey were formulated based on the landmarks in the shopping environments and realistically possible product classification in the selected OPs. Further, the subjects' faces were observed while they were using the OPs to assess emotions during the actual shopping session and analyze non-verbal emotions. Observations of the non-verbal emotions helped identify and avoid memory bias and the elicitation of socially desirable responses that could occur during the verbal assessment of emotional experience after the shopping session (Barrett 2012). Furthermore, the subjects were asked to search for two OTC medications, one predefined and the other self-selected,

to induce the subjects to use different information and various search options offered on the OPs. In other words, an attempt was made to create a realistic shopping situation in which the subjects felt undisturbed and were isolated from the environment outside the OP.

5.1 MAIN FINDINGS AND IMPLICATIONS

The first step in the analysis was to review the tested OPs for differences in perceived search convenience. No such differences were found. That could be because the four selected pharmacies were those with the largest market share. Therefore, one of the reasons for the high sales achieved by the selected pharmacies could be convenience, which is considered as one of the main drivers for the success of online retail (Kaura et al. 2015; Kumar et al. 2020).

The estimated structural model revealed significant positive relations between knowledge about orientation in OPs and SC. This result shows that existing knowledge structures from other online stores have a positive impact on the perceived convenience. In line with this, high product classification has also been shown to impact SC positively. This result supports the findings from the previous studies (Tuch et al. 2009; Deng and Poole 2010) and strengthens our assumptions that clear, logical, and coherent presentation of goods has a positive impact on search convenience when buying medications. Furthermore, a finding is that knowledge of navigation in BMP is not a significant predictor of SC. This outcome is not in line with the findings by Jayawardhena et al. (2007). They stated that for online stores, familiarity with the structures in the offline environments was used by the shoppers to understand and navigate through the online environment (Jayawardhena et al. 2007). Although the construct *navigation in BMP* correlates significantly with SC (see Table 2), it is neither a significant predictor of SC nor does it influence SC perceptions (see Section 4.2.1). This result is regarding the fundamental differences between online and offline pharmacies not surprising. In conventional BMPs, original products are placed on shelves, customers can see the products in their original packages, their images, texts, and sizes. Generally, in the BMPs, signs are placed above the product shelves describing the field of application or the ailment cured by the products. Also, the staff assists the buyer to find the desired product. These advantages can be partly or completely absent in OPs. The products' original size cannot be perceived at first view because the images of various products are of the same size, which can be disproportionate to the products' content size and therefore convey an incorrect impression about the product's size and content. A greater disadvantage can be the absence of staff to help. This is substituted in OPs by the product suggestions that appear when customers type search words on the search bar. Patterns of the offline environment (BMP) can barely be recreated in OPs. Similar findings are shown for different website types (Papachristos and Avouris 2013; Roth et al. 2013).

In summary, these results indicate that customers of OPs consider orientation and navigation as convenient, such as on other websites. This finding coincides with the previous findings of mental models that depend on the experience of object locations and help customers to find products more easily (Roth et al. 2013). Therefore, the use of standard or familiar navigation structures in OPs increases the perceived SC of an OP.

In the motor expressions of convenience that we measured through facial expressions, we found a significant relationship between high SC and positive emotion intensities (H1). This result supports the previous findings, which showed that convenience evokes positive emotions (Goldberg 2012; Hidayat and Satria 2020). Our assumption that with increasing SC, the positive emotions intensities would decrease is supported. The higher the SC, the lower the intensities of positive emotion measured from the user's facial expression. In other words: the emotional experience changes from the tense/excited positive to the calm positive with increasing SC. Customers seem to be less excited when shopping as they can navigate quickly and easily through the OP. Theoretical considerations, which draw on the dimensional view of emotions (e.g., Mehrabian and Russell 1974; Russell 1980; Watson and Tellegen 1985; Plutchik 1991) and categorize words describing the convenience emotion, were thereby supported with physiological data.

Testing our assumption (H2) that customers will spend more time with decreasing SC is not supported. A look at the average search length and its standard deviation (M = 89.9 sec, SD = 66.07 sec) reveals a generally short search length. Hence, we conclude that perception of SC, in this case, did not affect the search length since customers could,

generally, find the desired medications very quickly. As the occurrence of interruptions or the slowness of the internet were not considered in the investigation, the above result seems reasonable. Moreover, SC is, on average, rated above the mean value of the scale (M = 5.34, SD = 1.23), which is an indicator of the ease of navigation.

Nevertheless, with increasing search length, negative facial expressions' intensities increased (H3). At first glance, this may be confusing since SC had no effect on search length nor were they correlated, but a closer look brings more clarity. First, since interruptions were not measured or analyzed in the recordings, possibly time spent on search affected the experience unconsciously. This effect is reflected in the user's face but not in the deliberated ratings of SC expressed in the post-experiment survey of the participants. Second self-reports rely on memory and, therefore, can be biased due to social expectations (Krumpal 2013). Therefore, possibly the participants had inconvenient experiences that they did not reveal in the self-reports, especially if the search was successful. This interpretation is in line with Jokinens' (2015) finding that accomplishing tasks and overcoming obstacles leads to a positive perception. Third, the concept of search convenience is based on the desire to save time. By measuring the time spent during the search the time spent in the search was captured objectively, this can differ from the participants' perceptions of time, which is likely to be biased by comparison with other situations that the construct of time-saving introduces.

This result, which cannot be captured from self-reports is, however, captured through the observational data and provides new information about the shopping process. Also, the facial expressions captured during the search show that SC and search length both elicit emotion, which is reflected in the facial expressions in various ways: SC affects positive emotion intensities, and search length affects negative emotion intensities. This outcome supports the concept of convenience with observed physiological data.

5.2 LIMITATIONS AND FURTHER RESEARCH

This study has its limitations. Due to the limited analytical capacity of the FaceReader technology, we could not analyze discrete emotions related to convenience. However, as shown, the information derived through the analysis can be augmented by the interpretation of the valence and intensity of emotions to provide a deeper understanding of the construct of convenience.

In some cases, the FaceReader technology may even provide invalid analyses if the analyzed faces are partially obscured by glasses, headbands, beards, etc. Therefore, the step of modeling the applied mask for each video was manually checked to ensure that the face in the video was not masked (see Subsection 3.4) and the key points on the subject's face were correctly recognized. We excluded 122 videos from the analysis due to incorrect or incomplete face recognition either because the face was occluded or the complete face was not captured in the videos. The analyses of only those faces that withstood this scrutiny were included in the study.

This attempt to measure emotional feedback in a close-to-reality situation and its interpretation have known limitations. As numerous studies have shown, website cues, such as graphics and colors, which were not surveyed in this investigation, can evoke emotional responses (e.g., Yu and Ko 2017; Gunaratne et al. 2019). Also, it has been shown that visual aesthetics can influence the perceived usability of a website. Users' ratings on usability can be influenced by pleasing design factors that influence the perception of performance and the time spent (Moshagen et al. 2009). Though controlling all these properties is not impossible in real-world situations, it is, no doubt, difficult.

Moreover, for conceptualizing the emotional user experience of individuals, a critical aspect is the capacity of psychological theory to explain why the intensities of individuals' emotions evoked by a certain experience vary (Saariluomaa 2004). Researchers often address the lack of substance to explain relationships between the evaluated affective and cognitive constructs (Fevrier et al. 2011; Saariluomaand and Jokinen 2014; Jokinen 2015; Hornbaek and Hertzum 2017). Some questions on methods and theories in this field remain open to debate. However, the benefits of using nonverbal measurements of emotions are undoubted. Attempting to interpret the verbal data from the survey and the nonverbal data from the videos against the backdrop of convenience to determine how individuals' ratings of convenience may be associated with emotion was therefore enabled by the theories and methods mentioned above. Further investigations in this field should aim at evaluating the appraisal variables used in the theory through self-reports to understand how convenience appraisals can give rise to emotions when purchasing medication in OPs.

Additionally, the sample consisted of predominantly young people with experience in online shopping. In further studies, older people and people with less online shopping experience may be included.

Moreover, the investigation was limited to non-prescription medications since these were of more interest to OPs at the time this study was conducted because this type of medication was more in demand. However, with the introduction of e-prescription, this trend can change. Therefore, an evaluation of convenience for prescription medication could be undertaken in further research.

6. CONCLUSION

By utilizing automated facial expression analysis and estimating the relationship between search convenience and emotions with PLS-SEM, this study provides new insights into the concept of convenience, both theoretically and methodically. With a selected theoretical approach to convenience and emotions and the selected method, less investigated areas in consumer research have been explored. Also, a less explored phenomenon - the purchase of non-prescription medications from online pharmacies – is investigated.

Our results show that customers use search and navigation structures from environments they are familiar with to find their way around online pharmacy websites. In this context, navigational knowledge of other online pharmacy websites contributes to search convenience and, accordingly, familiarity with the online pharmacy has a positive effect on search convenience. Customers' knowledge of navigation structures from brick-and-mortar pharmacies does not affect search convenience in online pharmacies. In addition, a well-structured product arrangement with regard to, for example, the indication or brand of the medication contributes to search convenience.

Search convenience itself has an influence on the emotions of customers during the shopping experience. As the rating of search convenience increased, customers showed less intense positive emotions on their faces. Observational data from facial expression analysis showed that the emotions associated with convenience, which we defined as comfort, relaxation, and being at ease, are reflected in customers' faces when they experience convenience. The same data also showed that as the time of search increases, being a critical aspect of convenience, the intensity of negative emotions also increases.

From a methodical perspective, this study underscores the efficacy of facial expression analysis for understanding and assessing emotions that are immediate and unconscious.

Moreover, this study supports with observational data the theoretical categorizations of verbally expressed emotions related to convenience in dimensional views, which is a significant contribution to the field of emotion theory.

Additionally, the data analysis showed that the selection of online pharmacies with the largest market shares in Germany did not cause a difference in the ratings of search convenience. That suggests convenience can be assumed to be an essential factor for the success of an online pharmacy, as it is in other sectors of e-commerce.

REFERENCES

ABDA – Bundesvereinigung Deutscher Apothekerverbände e. V. (2021). Die Apotheke. Zahlen, Daten, Fakten 2021. Berlin.

Addis, Michela/Holbrook, Morris B. (2001). On the conceptual link between mass customisation and experiential consumption: an explosion of subjectivity. Journal of Consumer Behaviour 1 (1), 50–66. https://doi.org/10.1002/cb.53.

Aghili, Khadijeh/Dehdashti Shahrokh, Zohre (2015). The effect of service convenience on word-of-mouth and repurchase intention. New Marketing Research Journal 5 (2), 15–36. Available online at https://nmrj.ui.ac.ir/article_17780.html?lang=en.

Ahn, Sun Joo/Jabon, Maria/Bailenson, Jeremy (2008). Facial expressions as predictors of online buying intention. In: Proceedings of the 58th Annual International Communication Association Conference, May 22-26, 22–26.

Albrecht, Martin/der Heiden, Iris an/Brenck, Andreas/Ochmann, Richard/Schiffhorst, Guido (2020). Ökonomisches gutachten zum apothekenmarkt. IGES Institut und Deutsches Institut für Wirtschaftsforschung e.V.

Anderson, Adam K./Sobel, Noam (2003). Dissociating Intensity from Valence as Sensory Inputs to Emotion. Neuron 39 (4), 581–583. https://doi.org/10.1016/S0896-6273(03)00504-X.

Apter, Michael J. (Ed.) (2001). Motivational styles in everyday life. A guide to reversal theory. Washington DC, American Psychological Association (APA).

Babin, Barry J./Darden, William R./Griffin Mitch (1994). Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value. Journal of Consumer Research 20 (4), 644–656. https://doi.org/10.1086/209376.

Bagdare, Shilpa (2014). Convenience and atmospherics as predictors of retail customer experience. International of Marketing and Business Communications 3 (2), 9–16. Available online at https://www.proquest.com/openview/b224577b70ad3f4242457c2c255afe31/1?pq-origsite=gscholar&cbl=2030936.

Balzarotti, Stefania/Piccini, Luca/Andreoni, Giuseppe/Ciceri, Rita (2014). "I know that you know how i feel": Behavioral and physiological signals demonstrate emotional attunement while interacting with a computer simulating emotional intelligence. Journal of Nonverbal Behavior 38 (3), 283–299. https://doi.org/10.1007/s10919-014-0180-6.

Barrett, Lisa F. (2012). Emotions are real. Emotion 12 (3), 413–429. https://doi.org/10.1037/a0027555.

Bayrakdar, Sümeyye/Akgün, Devrim/Yücedağ, İbrahim (2016). A survey on automatic analysis of facial expressions. Sakarya University Journal of Science 20 (2), 383–398. https://doi.org/10.16984/saufenbilder.92940.

Beauchamp, Michelle Bednarz/Ponder, Nicole (2010). Perceptions of retail convenience for in-store and online shoppers. The Marketing Management Journal 20 (1), 49–65. Available online at http://www.mmaglobal.org/publications/MMJ/MMJ-Issues/2010-Spring/MMJ-2010-Spring-Vol20-Issue1-Beauchamp-Ponder-pp49-65.pdf.

Benitez, Jose/Henseler, Jörg/Castillo, Ana/Schuberth, Florian (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. Information & Management 57 (2), 103168. https://doi.org/10.1016/j.im.2019.05.003.

Berry, Leonard L./Seiders, Kathleen/Grewal, Dhruv (2002). Understanding Service Convenience. Journal of Marketing 66 (3), 1–17. https://doi.org/10.1509/jmkg.66.3.1.18505.

Bhatti, Anam/Akram, Hamza/Basit, Hafiz Muhammad/Khan, Ahmed Usman/Raza Naqvi, Syeda Mahwish/Bilal, Muhammad (2020). E-commerce trends during COVID-19 pandemic. International Journal of Future Generation Communication and Networking 13 (2), 1449–1452.

Broeder, Peter/Gkogka, Anna (2020). The cultural impact of navigation design in global e-commerce. Journal of Tourism, Heritage & Services Marketing (JTHSM) 6 (3), 46–53.

Cannon, Walter B. (1927). The James Lange theory of emotions: A critical examination and an alternative theory. The American Journal of Psychology 39 (1/4), 106–124.

Carlson, Jamie/O'Cass, Aron (2010). Exploring the relationships between e-service quality, satisfaction, attitudes and behaviours in content-driven e-service web sites. Journal of Services Marketing 24 (2), 112–127. https://doi.org/10.1108/08876041011031091.

Carolyn Wickware (2021). Online pharmacy dispensing volume grows by 45 % in 2020, fuelled by COVID-19 pandemic. Available online at DOI: 10.1211/PJ.2021.1.78119 (accessed 1/25/2022).

Carù, Antonella/Cova, Bernard (2003). Revisiting Consumption Experience: A More Humble but Complete View of the Concept. Marketing Theory 3 (2), 267–286. https://doi.org/10.1177/14705931030032004.

Cassel, Claes M./Hackl, Peter/Westlund, Anders H. (2000). On measurement of intangible assets: A study of robustness of partial least squares. Total Quality Management 11 (7), 897–907. https://doi.org/10.1080/09544120050135443.

Clark, Elisabeth A. (2020). Application of Automated Facial Expression Analysis and Facial Action Coding System to Asses Affective Response to Consumer Products. Dissertation. Blacksburg, Virginia USA.

Clore, Gerald L./Huntsinger, Jeffrey R. (2007). How emotions inform judgment and regulate thought. Trends in Cognitive Sciences 11 (9), 393–399. https://doi.org/10.1016/j.tics.2007.08.005.

Clore, Gerald L./Palmer, Janet E. (2009). Affective guidance of intelligent agents: How emotion controls cognition. Cognitive Systems Research 10 (1), 21–30. https://doi.org/10.1016/j.cogsys.2008.03.002.

Clore, Gerald L./Schwarz, Norbert/Conway, Michael (1994). Affective causes and consequences of social information processing. In: Robert S. Wyer/Thomas K. Srull (Eds.). Handbook of social cognition: Basic processes. 2nd ed. Hillsdale, NJ, US, Lawrence Erlbaum, 323–417.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale, NJ, Erlbaum.

Coursaris, Constantinos K./van Osch, Wietske (2016). A Cognitive-Affective Model of Perceived User Satisfaction (CAMPUS): The complementary effects and interdependence of usability and aesthetics in IS design. Information & Management 53 (2), 252–264. https://doi.org/10.1016/j.im.2015.10.003.

Cyr, Dianne (2008). Modeling web site design across cultures: Relationships to trust, satisfaction, and e-Loyalty. Journal of Management Information Systems 24 (4), 47–72. https://doi.org/10.2753/MIS0742-1222240402.

Dalmoro, Marlon/Isabella, Giuliana/Almeida, Stefânia Ordovás de/dos Santos Fleck, Joao, Pedro (2019). Developing a holistic understanding of consumers' experiences: An integrative analysis of objective and subjective elements in physical retail purchases. European Journal of Marketing 53 (10), 2054–2079. https://doi.org/10.1108/EJM-10-2016-0586.

Damasio, Antonio R. (1994). Descartes' error: Emotion, reason and the human brain. New York, Putnam.

Danner, Lukas/Duerrschmid, Klaus (2018). Automatic facial expressions analysis in consumer science. In: Gaston Ares/Paula Varela (Eds.). Methods in consumer research. Elsevier, 231–252.

Darwin, Charles/Prodger, Philip (1998). The Expression of the Emotions in Man and Animals. Oxford, MA, USA, Oxford University Press.

de Sousa Pernes, Ronald B. (2015). Are Our Emotions True Cognitions? Studia Humana 4 (2), 39–44. https://doi.org/10.1515/sh-2015-0015.

Deng, Liqiong/Poole, Marshall Scott (2010). Affect in web interfaces: A study of the impacts of web page visual complexity and order. MIS Quarterly 34 (4), 711–730.

Djan, Ismulyana/Rubbiah Adawiyyah, Siti (2020). The Effect of Convenience and Trust to Purchase Decision and Its Impact to Customer Satisfaction. International Journal of Business and Economics Research 9 (4), 263–269. https://doi.org/10.11648/j.ijber.20200904.23.

Duarte, Paulo/e Silva, Susana Costa/Ferreira, Margarida Bernardo (2018). How convenient is it? Delivering online shopping convenience to enhance customer satisfaction and encourage e-WOM. Journal of Retailing and Consumer Services 44, 161–169.

Eder, Andreas/Brosch, Tobias (2017). Emotion. In: J. Müsseler/M. Rieger (Eds.). Allgemeine Psychologie. 3rd ed. Berlin/ Heidelberg, Springer.

EHI Retail Institute (2016). E-Commerce-Nettoumsatz der größten Online-Shops für Medika-mente und Gesundheitsartikel in Deutschland im Jahr 2015 (in Millionen Euro). Available online at https://www.handelsdaten.de/e-commerce/ versandapotheken-ranking-umsatz-top-10-online-shops-medikamente-gesundheitsartikel (accessed 9/16/2020).

Ekman, Paul (1993). Facial Experssion and Emotion. American Psychologist (48), 384–392.

Ekman, Paul (1999). Basic Emotions. In: Tim Dalgleish/Mick J. Power (Eds.). Handbook of Cognition and Emotion. Chichester, UK, John Wiley & Sons, Ltd, 45–60.

Ekman, Paul/Friesen, Wallace V. (1976). Measuring facial movement. Environmental Psychology and Nonverbal Behavior 1 (1), 56–76.

Ekman, Paul/Friesen, Wallace V. (1978). Facial action coding system. Palo Alto, CA, Consulting Psychologist Press.

Ekman, Paul/Friesen, Wallace V./Hager, Joseph C. (2002). Facial action coding system. Salt Lake City, Utah, A Human Face.

Ekman, Paul/O´Sullivan, Maureen/Friesen, Wallace V./Scherer, K. R. (1991). Invited article: Face, voice, and body in detecting deceit. Journal of Nonverbal Behaviour 15 (2), 125–135.

Esch, Franz-Rudolf/Thelen, Eva (1997). Ein konzeptionelles Modell zum Suchverhalten von Kunden in Einzelhandelsunternehmen. In: Volker Trommsdorff/Helmut Bunge/Andrea Bookhagen (Eds.). Handelsforschung 1997/98. Wiesbaden, Gabler Verlag, 297–314.

Esposito Vinzi, Vincenzo/Chin, Wynne W./Henseler, Jörg/Wang, Huiwen (Eds.) (2010). Handbook of Partial Least Squares. Concepts, Methods and Applications. Berlin, Heidelberg, Springer.

Fevrier, F./Gauducheau, N./Jamet, E./Rouxel, G./Salembier, P. (2011). The Study of Affects in Human-Cumputer-Interactions: Theories, Methods, and Benefits. Le Travail Humain 74 (2), 183–201. https://doi.org/10.3917/th.742.0183.

Forgas, Joseph P./Bower, Gordon H. (1987). Mood effects on person-perception judgments. Journal of personality and social psychology 53 (1), 53–60. https://doi.org/10.1037/0022-3514.53.1.53.

Fortune Business Insights (2019). ePharmacy market size, share and industry analysis by product (over-the-counter products, prescription medicine) and regional forecast, 2019-2026, Pressemitteilung vom 2019. Available online at https://www. fortunebusinessinsights.com/industry-reports/epharmacy-market-100238.

Frijda, Nico H. (1986). The Emotions. Cambridge, Cambridge University Press.

Gardner, Meryl P./Vandersteel, Marion (1984). The Consumer's Mood: An Important Situational Variable. North American Advances in Consumer Research 11, 525–529. Available online at https://www.acrwebsite.org/volumes/5940/volumes/v11/ na-11.

Gast, Oliver (2018). User experience im e-commerce. Messung von emotionen bei der nutzung interaktiver anwendungen. Dissertation. Wiesbaden, Springer Fachmedien Wiesbaden.

Goldberg, Joseph H. (2012). Relating Perceived Web Page Complexity to Emotional Valence and Eye Movement Metrics. Proceedings of the Human Factors and Ergonomics Society Annual Meeting 56 (1), 501–505. https://doi. org/10.1177/1071181312561104.

González-Rodríguez, M. Rosario/Díaz-Fernández, M. Carmen/Pacheco Gómez, Carmen (2020). Facial-expression recognition: An emergent approach to the measurement of tourist satisfaction through emotions. Telematics and Informatics 51, 101404. https://doi.org/10.1016/j.tele.2020.101404.

Gunaratne, Nadeesha M./Gonzalez Viejo, Claudia/Gunaratne, Thejani M./Torrico, Damir D./Ashman, Hollis/Dunshea, Frank R./Fuentes, Sigfredo (2019). Effects of imagery as visual stimuli on the physiological and emotional responses. Journal of Multidisciplinary Scientific Journal 2 (2), 206–225. https://doi.org/10.3390/j2020015.

Hair, Joseph F./Hult, G. Tomas M./Ringle, Christian M./Sarstedt, Marko/Richter, Nicole F./Hauff, Sven (2017). Partial Least Squares Strukturgleichungsmodellierung. Eine anwendungsorientierte Einführung. München, Vahlen.

Hair, Joseph F./Ringle, Christian M./Sarstedt, Marko (2011). PLS-SEM: Indeed a Silver Bullet. Journal of Marketing Theory and Practice 19 (2), 139–152. https://doi.org/10.2753/MTP1069-6679190202.

Hair, Joseph F./Risher, Jeffrey J./Sarstedt, Marko/Ringle, Christian M. (2019). When to use and how to report the results of PLS-SEM. European Business Review 31 (1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203.

Hair, Joseph F./Sarstedt, Marko/Ringle, Christian M./Gudergan, Siegfried (2018). Advanced issues in partial least squares structural equation modeling. Los Angeles/London/New Delhi/Singapore/Washington DC/Melbourne, SAGE.

Hamann, Stephan (2003). Nosing in on the emotional brain. Nature neuroscience 6 (2), 106–108. https://doi.org/10.1038/nn0203-106.

Handa, Meenakshi/Gupta, Nirupma (2014). A Study of the Relationship between Shopping Orientation and Online Shopping Behavior among Indian Youth. Journal of Internet Commerce 13 (1), 22–44. https://doi.org/10.1080/15332861.2014.918437.

Hassenzahl, Marc/Diefenbach, S./Göritz, Anja S. (2010). Needs, affect, and interactive products - Facets of user experience. Interacting with Computers 22 (5), 353–362. https://doi.org/10.1016/j.intcom.2010.04.002.

Hatemi, Pete/Zorn, Christopher (2020). Pondering the shrinking number of retail pharmacies. PCMA study disputes its members' harm to brick-and-mortar businesses. Available online at https://www.pharmaceuticalcommerce.com/view/pondering-the-shrinking-number-of-retail-pharmacies.

Hausman, Angela V./Siekpe, Jeffrey Sam (2009). The effect of web interface features on consumer online purchase intentions. Journal of Business Research 62 (1), 5–13. https://doi.org/10.1016/j.jbusres.2008.01.018.

Henseler, Jörg/Ringle, Christian M./Sarstedt, Marko (2016). Testing measurement invariance of composites using partial least squares. International Marketing Review 33 (3), 405–431. https://doi.org/10.1108/IMR-09-2014-0304.

Hernández-Fernández, Dra Asunción/Mora, Elísabet/Vizcaíno Hernández, María Isabel (2019). When a new technological product launching fails: A multi-method approach of facial recognition and E-WOM sentiment analysis. Physiology & Behavior 200 (1), 130–138. https://doi.org/10.1016/j.physbeh.2018.04.023.

Hidayat, Darra Pradita/Satria, Hardika Widi (2020). The Effect of Convenience and Self-Efficacy Factors on the Consumption Experience, Mediated by Emotion. Advances in Social Science, Education and Humanities Research 426, 162–171. https://doi.org/10.2991/assehr.k.200331.138.

Hornbaek, K./Hertzum, M. (2017). Technology Acceptance and User Experience: A Review of the Experiential Component in HCI. ACM Transactions on Computer-Human Interaction 24 (5). https://doi.org/10.1145/3127358.

Hwang, Hyisung C./Matsumoto, David (2016). Measuring emotions in the face. In: Herbert L. Meiselman (Ed.). Emotion measurement. Woodhead Publishing, 125–144.

Izard, Carroll E. (1993). Four systems for emotion activation: cognitive and noncognitive processes. Psychological Review 100 (1), 68–90. https://doi.org/10.1037/0033-295X.100.1.68.

Izard, Carroll E. (2010). The many meanings/aspects of emotion: Definitions, functions, activation, and regulation. Emotion Review 2 (4), 363–370. https://doi.org/10.1177/1754073910374661.

James, William (1884). What is an emotion? Mind os-IX (34), 188–205. https://doi.org/10.1093/mind/os-IX.34.188.

Jang, Ju Yeun/Baek, Eunsoo/Yoon, So-Yeon/Choo, Ho Jung (2018). Store design: Visual complexity and consumer responses. International Journal of Design 12 (2), 105–118. Available online at http://www.ijdesign.org/index.php/ijdesign/article/view/2934.

Jayawardhena, Chanaka/Tiu Wright, Len/Dennis, Charles (2007). Consumers online: intentions, orientations and segmentation. International Journal of Retail & Distribution Management 35 (6), 515–526. https://doi.org/10.1108/09590550710750377.

Jiang, Ling Alice/Yang, Zhilin/Jun, Minjoon (2013). Measuring consumer perceptions of online shopping convenience. Journal of Service Management 24 (2), 191–214. https://doi.org/10.1108/09564231311323962.

Jokinen, J. P.P. (2015). Emotional user experience: Traits, events, and states. International Journal of Human-Computer Studies 76, 67–77. https://doi.org/10.1016/j.ijhcs.2014.12.006.

Kaltcheva, Velitchka D./Weitz, Barton A. (2006). When Should a Retailer Create an Exciting Store Environment? Journal of Marketing 70 (1), 107–118. https://doi.org/10.1509/jmkg.70.1.107.qxd.

Kaura, Vinita/Durga Prasad, Ch. S./Sharma, Sourabh (2015). Service quality, service convenience, price and fairness, customer loyalty, and the mediating role of customer satisfaction. International Journal of Bank Marketing 33 (4), 404–422. https://doi.org/10.1108/IJBM-04-2014-0048.

Keltner, Dacher/Gross, James J. (1999). Functional Accounts of Emotions. Cognition & Emotion 13 (5), 467–480. https://doi.org/10.1080/026999399379140.

Khalifa, Mohamed/Limayem, Moez (2003). Drivers of Internet shopping. Communications of the ACM 46 (12), 233–239. https://doi.org/10.1145/953460.953505.

Kleinginna, Paul R./Kleinginna, Anne M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. Motivation and Emotion 5 (4), 345–379. https://doi.org/10.1007/BF00992553.

Krumpal, Ivar (2013). Determinants of social desirability bias in sensitive surveys: a literature review. Quality & Quantity 47 (4), 2025–2047. https://doi.org/10.1007/s11135-011-9640-9.

Kumar, Rajiv/Sachan, Amit/Dutta, Tanusree (2020). Examining the Impact of e-Retailing Convenience Dimensions on Behavioral Intention: The Mediating Role of Satisfaction. Journal of Internet Commerce 19 (4), 466–494. https://doi.org/10.1080/15332861.2020.1788367.

Lazarus, Richard S. (1991). Emotion and adaptation. New York, Oxford University Press.

LeDoux, Joseph E. (2012). Evolution of human emotion: a view through fear. Progress in Brain Research 195, 431–442. https://doi.org/10.1016/B978-0-444-53860-4.00021-0.

Liliana, Dewi Yanti/Basaruddin, T. (2018). Review of Automatic Emotion Recognition Through Facial Expression Analysis. International Conference on Electrical Engineering and Computer Science (ICECOS) 2018, 231–236. https://doi.org/10.1109/ICECOS.2018.8605222.

Liu, Fei/Lim, Eric T. K./Li, Hongxiu/Tan, Chee-Wee/Cyr, Dianne (2020). Disentangling utilitarian and hedonic consumption behavior in online shopping: An expectation disconfirmation perspective. Information & Management 57 (3), 103199. https://doi.org/10.1016/j.im.2019.103199.

Lloyd, Alison Elisabeth/Ricky, Y. ChanK./Yip, Leslie S.C./Chan, Andrew (2014). Time buying and time saving: effects on service convenience and the shopping experience at the mall. Journal of Services Marketing 28 (1), 36–49. https://doi.org/10.1108/JSM-03-2012-0065.

Loijens, Leanne/Krips, Olga (2019). FaceReader methodology note. Available online at https://www.noldus.com/files/file_manager/downloads/whitepaper/FaceReader_Methodology.pdf?utm_campaign=Downloads&utm_source=hs_automation&utm_medium=email&utm_content=59367721 (accessed 4/16/2020).

Loijens, Leanne/Krips, Olga/Grieco, Fabrizio/van Kuilenburg, Hans/Uyl, Marten den/Ivan, Paul (2018). FaceReader version 8: Reference manual.

Machleit, Karen A./Eroglu, Sevgin A. (2000). Describing and Measuring Emotional Response to Shopping Experience. Journal of Business Research (49), 101–111.

Mehrabian, Albert/Russell, James A. (1974). An Approach to Environmental Psychology. MIT Press.

Moors, Agnes/Ellsworth, Phoebe C./Scherer, K. R./Frijda, Nico H. (2013). Appraisal theories of emotion: State of the art and future development. Emotion Review 5 (2), 119–124. https://doi.org/10.1177/1754073912468165.

Moors, Agnes/van de Cruys, Sander/Pourtois, Gilles (2021). Comparison of the determinants for positive and negative affect proposed by appraisal theories, goal-directed theories, and predictive processing theories. Current Opinion in Behavioral Sciences 39, 147–152. https://doi.org/10.1016/j.cobeha.2021.03.015.

Moshagen, M./Musch, J./Göritz, Anja S. (2009). A blessing, not a curse: Experimental evidence for beneficial effects of visual aesthetics on performance. Ergonomics 52 (10), 1311–1320. https://doi.org/10.1080/00140130903061717.

Nunnally, Jum C. (1994). Psychometric theory 3E. New York, Tata McGraw-Hill Education.

Nurdianasari, Rista/Indriani, Farida (2021). Study on perceived online convenience and customer satisfaction toward behavioral intention in online shopping. International Journal of Economics, Business and Accounting Research 5 (2).

Palacios, Sergio/Jun, Minjoon (2020). An exploration of online shopping convenience dimensions and their associations with customer satisfaction. International Journal of Electronic Marketing and Retailing 11 (1), 24–49.

Papachristos, Eleftherios/Avouris, Nikolaos (2013). The influence of website category on aesthetic preferences. In: Paula Kotzé/Gitte Lindgaard/Gary Marsden et al. (Eds.). Human-Computer Interaction -- INTERACT 2013. 14th IFIP TC 13 International Conference, Cape Town, South Africa, September 2-6, 2013, Proceedings, Part I. Springer.

Park, Chung-Hoon/Kim, Young-Gul (2003). Identifying key factors affecting consumer purchase behavior in an online shopping context. International Journal of Retail & Distribution Management 31 (1), 16–29. https://doi.org/10.1108/09590550310457818.

Pham, Quoc Trung/Tran, Xuan Phuc/Misra, Sanjay/Maskeliūnas, Rytis/Damaševičius, Robertas (2018). Relationship between Convenience, Perceived Value, and Repurchase Intention in Online Shopping in Vietnam. Sustainability 10 (1), 156. https://doi.org/10.3390/su10010156.

Picard, Rosalind W. (2003). Affective Computing: Challenges. International Journal of Human-Computer Studies 59 (1-2), 55–64. https://doi.org/10.1016/S1071-5819(03)00052-1.

Plutchik, Robert (1991). The emotions. Lanham, Md, University Press of America.

Porat, T./Tractinsky, Noam (2012). It's a pleasure buying here: The effects of web-store design on consumers' emotions and attitudes. Human-Computer Interaction 27 (3), 235–276.

Pramuk, Medi (2020). Development and validation of a scale to measure the perceived benefits and risks of online pharmacy stores. International Journal of Pharmaceutical Research 12 (03). https://doi.org/10.31838/ijpr/2020.12.03.027.

Reisenzein, Rainer/Junge, Martin/Studtmann, Markus/Huber, Oswald (2014). Observational approaches to the measurement of emotions. In: Reinhard Pekrun/Lisa Linnenbrink-Garcia (Eds.). International handbook of emotions in education. New York, Routledge, 580–601.

Reith, Christina (2007). Convenience im Handel. Zugl.: Vallendar, Wiss. Hochsch. für Unternehmensführung, Dissertation, 2006. Frankfurt am Main, Peter Lang Verlag.

Research and Markets (2021). Europe's online pharmacy industry, 2020 analysis by platform, type and geography. Available online at https://www.globenewswire.com/news-release/2020/04/08/2013547/0/en/Europe-s-Online-Pharmacy-Industry-2020-Analysis-by-Platform-Type-and-Geography.html (accessed 1/11/2021).

Roth, Sandra P./Tuch, Alexandre N./Mekler, Elisa D./Bargas-Avila, Javier A./Opwis, Klaus (2013). Location matters, especially for non-salient features–An eye-tracking study on the effects of web object placement on different types of websites. International Journal of Human-Computer Studies 71 (3), 228–235. https://doi.org/10.1016/j.ijhcs.2012.09.001.

Russell, James A. (1980). A circumplex model of affect. Journal of personality and social psychology 39 (6), 1161–1178. https://doi.org/10.1037/h0077714.

Saariluomaa, Pertti (2004). Explanatory frameworks in interaction design. In: Future Interaction Design, 67–83.

Saariluomaand, P./Jokinen, J. P.P. (2014). Emotional Dimensions of User Experience: A User Psychological Analysis. International Journal of Human-Computer Interaction 30 (4), 303–320. https://doi.org/10.1080/10447318.2013.858460.

Sander, David/Grandjean, Didier/Scherer, K. R. (2005). A systems approach to appraisal mechanisms in emotion. Neural Networks 18 (4), 317–352. https://doi.org/10.1016/j.neunet.2005.03.001.

Sander, David/Grandjean, Didier/Scherer, K. R. (2018). An appraisal-driven componential approach to the emotional brain. Emotion Review 10 (3), 219–231. https://doi.org/10.1177/1754073918765653.

Scherer, K. R. (2005). What are emotions? And how can they be measured? Social Science Information 44 (4), 695–729. https://doi.org/10.1177/0539018405058216.

Seiders, Kathleen/Voss, Glenn B./Godfrey, Andrea L./Grewal, Dhruv (2007). SERVCON: development and validation of a multidimensional service convenience scale. Journal of the Academy of Marketing Science 35 (1), 144–156. https://doi.org/10.1007/s11747-006-0001-5.

Sherman, Elaine/Mathur, Anil/Smith, Ruth Belk (1997). Store environment and consumer purchase behavior: Mediating role of consumer emotions. Psychology & Marketing 14 (4), 361–378.

Spake, Deborah F./Zachary Finney, R./Joseph, Mathew (2011). Experience, comfort, and privacy concerns: antecedents of online spending. Journal of Research in Interactive Marketing 5 (1), 5–28. https://doi.org/10.1108/17505931111121507.

Srull, Thomas K. (1983). Affect and Memory: the Impact of Affective Reactions in Advertising on the Representation of Product Information in Memory. North American Advances in Consumer Research 10, 520–525. Available online at https://www.acrwebsite.org/volumes/6173/volumes/v10/na%20-%2010.

Staiano, Jacopo/Menéndez, María/Battocchi, Alberto/Angeli, Antonella de/Sebe, Nicu (2012). UX_Mate: From Facial Expressions to UX Evaluation. Designing Interactive Systems.

Statista (2022). Online pharmacy: Worldwide statista market forecast. Available online at https://www.statista.com/outlook/dmo/digital-health/ehealth/online-pharmacy/worldwide.

Tang, Yuan/Yang, Yu-Tao/Shao, Yun-Fei (2019). Acceptance of Online Medical Websites: An Empirical Study in China. International Journal of Environmental Research and Public Health 16 (6). https://doi.org/10.3390/ijerph16060943.

Tuch, Alexandre N./Bargas-Avila, Javier A./Opwis, Klaus/Wilhelm, Frank H. (2009). Visual complexity of websites: Effects on users' experience, physiology, performance, and memory. International Journal of Human-Computer Studies 67 (9), 703–715. https://doi.org/10.1016/j.ijhcs.2009.04.002.

Usman, Osly/Prihastomo, Galih (2020). The Influence of Promotion, Trust, and Comfort on Online Purchase Decisions. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3638155.

Vink, Peter/Hallbeck, S. (2012). Editorial: Comfort and discomfort studies demonstrate the need for a new model. Applied Ergonomics 43 (2), 271–276. https://doi.org/10.1016/j.apergo.2011.06.001.

Watson, D./Tellegen, A. (1985). Toward a consensual structure of mood. Psychological Bulletin 98 (2), 219–235. https://doi.org/10.1037/0033-2909.98.2.219.

Wieringa, Jaap Edo/Reber, Katrin Christiane./Leeflang, Peter (2015). Improving pharmacy store performance: The merits of over-the-counter drugs. European Journal of Marketing 49 (7/8), 1276–1299. https://doi.org/10.1108/EJM-06-2013-0331.

Williams, Patti (2014). Emotions and Consumer Behavior. Journal of Consumer Research 40 (5), 8–11. https://doi.org/10.1086/674429.

Winkielman, Piotr/Berridge, Kent C. (2004). Unconsciuos Emotion. Current Directions in Psychological Science (13), 120–123.

Winkielman, Piotr/Berridge, Kent C./Wilbarger, Julia L. (2005). Unconscious affective reactions to masked happy versus angry faces influence consumption behavior and judgments of value. Psychological Bulletin 31 (1), 121–135. https://doi.org/10.1177/0146167204271309.

Wolfinbarger, Mary/Gilly, Mary C. (2003). eTailQ: dimensionalizing, measuring and predicting etail quality. Journal of Retailing 79 (3), 183–198. https://doi.org/10.1016/S0022-4359(03)00034-4.

Wundt, Wilhelm (1891). Zur lehre von gemühtsbewegungen. Philosophische Studien (6), 335–393.

Yale, Laura/Venkatesh, Alladi (1986). Toward the Construct of Convenience in Consumer Research. North American Advances in Consumer Research 13, 403–408. Available online at https://www.acrwebsite.org/volumes/5956/volumes/v13/na-13/full.

Yu, Chia-Yin/Ko, Chih-Hsiang (2017). Applying FaceReader to Recognize Consumer Emotions in Graphic Styles. Procedia CIRP 60, 104–109. https://doi.org/10.1016/j.procir.2017.01.014.

ANNEX

ANNEX 1:
DEMOGRAPHIC DETAILS AND ONLINE SHOPPING BEHAVIOR OF PARTICIPANTS

			n	%
Familiarity	All tested pharmacies	yes	40	25.8
		no	115	74.2
	Docmorris	yes	19	37.3
		no	32	62.7
	Sanicare	yes	5	18.5
		no	22	81.5
	Shop-Apotheke	yes	12	35.3
		no	22	64.7
	Medikamente-per-Klick	yes	4	9.3
		no	39	90.7
Frequency of browsing in online shops	not at all		4	2.6
	1–3 times per year		14	9.0
	1–2 times per quartile		11	7.1
	1–3 times per month		56	36.1
	at least 1 time per week		70	45.2
Frequency of browsing in online pharmacies	not at all		93	60.0
	1–3 times per year		38	24.5
	1–2 times per quartile		20	12.9
	1–3 times per month		3	1.9
	at least 1 time per week		1	0.6
Frequency of browsing in tested online pharmacy	not at all		115	74.2
	1–3 times per year		30	19.4
	1–2 times per quartile		5	3.2
	1–3 times per month		5	3.2
	at least 1 time per week		0	0
Frequency of browsing in brick-and-mortar pharmacies	not at all		3	1.9
	1–3 times per year		56	36.1
	1–2 times per quartile		62	40.0
	1–3 times per month		29	18.7
	at least 1 time per week		5	3.2
Frequency of shopping in online shops	not at all		7	4.5
	1–3 times per year		19	12.3
	1–2 times per quartile		52	33.5
	1–3 times per month		62	40.0
	at least 1 time per week		15	9.7
Frequency of shopping in online pharmacies	not at all		121	78.1
	1–3 times per year		17	11.0
	1–2 times per quartile		11	7.1
	1–3 times per month		4	2.6
	at least 1 time per week		2	1.3
Frequency of shopping in tested online pharmacy	not at all		128	82.6
	1–3 times per year		15	9.7
	1–2 times per quartile		8	5.2
	1–3 times per month		3	1.9
	at least 1 time per week		0	0
Frequency of shopping in brick-and-mortar pharmacies	not at all		5	3.2
	1–3 times per year		58	37.4
	1–2 times per quartile		66	42.6
	1–3 times per month		20	12.9
	at least 1 time per week		5	3.2

ANNEX 2:
MEASUREMENT MODEL EVALUATION RESULTS

	Construct/Indicator	Cronbach's Alpha	rho A	AVE	VIF	Weight	Loading
	Navigation in Brick-and-Mortar Pharmacies (formative Construct)						
	When I am in a brick-and-mortar pharmacy searching for a drug, I orient myself to ...						
Nav_BMP_1	… the shelf behind the sales counter.				1.188	.504	.701
Nav_BMP_2	… the recommendation of the pharmacy staff.				1.140	.052	.282
Nav_BMP_3	… the area of application (e.g., cold, pain, stomach & intestines, etc.).				1.984	.352	.759
Nav_BMP_4	… a well-known manufacturer (e.g., Ratiopharm, Hexal, Bayer etc.).				2.054	.379	.739
Nav_BMP_5	… a well-known brand (e.g., Aspirin, Wick, Voltaren etc.).				1.066	-.284	-.200
Nav_BMP_6	… a well-known product (e.g., Aspirin Complex, Wick Medinait, Voltaren forte Gel, etc.).				1.195	.035	.326
Nav_BMP_7	…. the dosage form of the drug (e.g., syrup, ointment, drops, etc.).				1.054	.108	.150
	Navigation in Online Pharmacies (Formative Construct)						
	When I am in an online pharmacy searching for a drug, I orient myself to ...						
Nav_OP_1	… the displayed products in the online pharmacy.				1.865	.140	.679
Nav_OP_2	… the suggestions for products of the online pharmacy.				1.229	.208	.352
Nav_OP_3	… the area of application (e.g., cold, pain, stomach & intestines, etc.).				1.632	-.0265	.411
Nav_OP_4	… a well-known manufacturer (e.g., Ratiopharm, Hexal, Bayer, etc.).				1.458	.239	.395
Nav_OP_5	… a well-known brand (e.g., Aspirin, Wick, Voltaren, etc.).				5.478	.893	.905
Nav_OP_6	… a well-known product (e.g., Aspirin Complex, Wick Medinait, Voltaren forte Gel, etc.).				5.457	-.251	.802
Nav_OP_7	…. the dosage form of the drug (e.g., syrup, ointment, drops, etc.).				1.860	.201	.702
	Product Classification (Formative Construct)						
	The drugs are arranged according to ...						
Class_1	… the indication (e.g., cold, pain, stomach & intestine, etc.).				2.039	.408	.842
Class_2	… the manufacturer (e.g., Ratiopharm, Hexal, Bayer etc.).				1.149	-.026	.303
Class_3	… the brand (e.g., Aspirin, Wick, Voltaren etc.).				3.704	.797	.947
Class_4	… well-known products (e.g., Aspirin Complex, Wick Medinait, Voltaren forte Gel etc.).				3.964	-.232	.792
Class_5	… the dosage form of the drug (e.g., syrup, ointment, drops, etc.).				1.994	.128	.727
	Search Convenience (SC) (Reflective Construct)	.920	.928	.535			
SC_1	In the online pharmacy, I immediately find what I'm looking for.						
SC_2	The online pharmacy has a very clear structure.						
SC_3	The online pharmacy is very well-arranged.						
SC_4	I can find my orientation in the online pharmacy very well.						
SC_5	The arrangement of drugs is very comprehensible.						
SC_6	The arrangement of drugs makes it easy to find desired products.						