

# Curves or Angles? How Typeface Curvature in Chatbots Influences Customer Experience

Quantitative research on the effect of typeface curvature on customer satisfaction and customer loyalty in a chatbot context, mediated by hedonic and utilitarian experiences and moderated by perceived risk

## Radboud University



**Name:** Idse D. ten Brinke

**Student number:** 4596536

**Master program:** Business Administration

**Master Specialisation:** Innovation & Entrepreneurship

**Faculty:** Nijmegen School of Management

**Institute:** Radboud University Nijmegen

**Supervisor:** dr. K. Sidaoui

**Second assessor:** dr. C. Horváth

**Submission date:** 14-08-2022

**Word count:** 12,608

## Preface

When you are reading this, you have my master thesis ‘Curves or angles? How typeface curvature in chatbots influences customer experience’ in front of you. I have written this thesis as part of finishing the master’s in Business Administration, specialisation Innovation & Entrepreneurship at Radboud University Nijmegen. It has been a long way to this point, having started in 2016 with my bachelor’s in Business Administration, which I finished in 2021. I have learned a lot during that time, on scientific level, as well as practical experience. Although I took my time to finish my bachelor’s degree, I started to feel the urge to challenge myself a bit more and finish my master’s degree within a year. The fact that you are reading this thesis in 2022, means this goal is still in sight. It has not always been easy, and lots of temptations had to be resisted during this year. A couple of people played a special role in keeping me on track, and I would like to take this moment to thank them for it.

Firstly, I would like to thank my girlfriend, who supported me throughout the entire period. Whether it was to calm me down in stressful periods, or to push me to study that extra day for an exam, she was good at both. Also, when stubborn like me, it is good to have someone around to objectively look at situations and to put things in perspective. Secondly, I want to thank my dear friends, who sometimes reminded me not to forget about the fun things in life and that it’s good to relax now and then, but also studied together with me in the library, helping me through the day. Thirdly, I want to thank my brothers for checking my thesis, and their helping feedback on it.

Furthermore, I want to express my gratitude to my fellow teammates, Stephanie, Pablo, and Maria, with whom I have gone through this rollercoaster together. It felt good to know that I was not alone in this. Last but not least, I want to thank my supervisor dr. Karim Sidaoui and my second assessor dr. Csilla Horváth. It has not always been easy for all of us, and I have definitely not made it easy for them sometimes. However, they have taught me what it is like to be an independent researcher, and to have a critical view on both my own work, and that of others. They have pushed me to make the best of this thesis, and to not settle for the bare minimum.

I hope you enjoy reading this thesis and get some new insights about this topic.

Idse ten Brinke  
Nijmegen, August 2022

## Abstract

**Purpose:** The purpose of this paper is to connect typeface (curvature) literature to chatbot research and customer experience (CX), by researching CX in its holistic nature in high and low risk chatbot contexts, looking at its outcomes: customer satisfaction and customer loyalty.

**Design/methodology/approach:** This study started with a systematic literature review (SLR) to dive into the existing theory. Based on this, an experimental design was used to test four conditions, differing in typeface curvature and perceived risk level. The respondents were shown one of the four conditions through a screen recording of a chatbot conversation. 324 respondents of 18 years and older completed the survey.

**Findings:** Most tested relationships turned out to be non-significant and but one, no hypotheses could be confirmed. Only a significant, positive effect of hedonic experience on customer loyalty was found (H2c). However, significant relations were found between the moderator and dependent variables, and between some control variables and dependent variables.

**Practical implications:** The significant effect found shows managers that it is important to create a positive hedonic experience, in order to retain customers. Also, the significant relations between some variables show that managers can utilise some factors to influence their CX, customer satisfaction, and customer loyalty.

**Originality/value:** This study contributes to various research topics, by linking typeface curvature to CX and its outcomes in a chatbot context. It opens doors for further research on how to deal with the shift from offline to online CX, and how to influence the outcomes.

## Table of Contents

<b>Preface .....</b>	<b>2</b>
<b>Abstract.....</b>	<b>3</b>
<b>1. Introduction .....</b>	<b>6</b>
1.1 Theoretical relevance and research question .....	8
1.2 Managerial relevance.....	9
1.3 Structure .....	9
<b>2. Theoretical background .....</b>	<b>10</b>
2.1 Customer Experience .....	<b>10</b>
2.1.1 CX in a chatbot context .....	11
2.1.2 Hedonic and utilitarian experiences .....	11
2.1.3 Customer satisfaction and customer loyalty.....	12
2.2 Typeface .....	<b>12</b>
2.2.1 Typeface curvature .....	12
2.3 Perceived risk.....	<b>13</b>
2.4 Hypotheses .....	<b>14</b>
2.4.1 Direct effect of typeface curvature on customer satisfaction and customer loyalty.....	14
2.4.2 Mediating effect of hedonic and utilitarian experiences .....	14
2.4.3 Moderating effect of perceived risk.....	15
2.5 Control variables .....	<b>16</b>
<b>3. Methodology .....</b>	<b>19</b>
3.1 Systematic literature review .....	<b>19</b>
3.2 Experiment .....	<b>20</b>
3.2.1 Pre-tests .....	21
3.2.2 Main experiment.....	22
3.2.3 Data collection .....	23
3.3 Sample .....	<b>23</b>
3.4 Measurements .....	<b>24</b>
3.5 Operationalisation .....	<b>26</b>
3.6 Data preparation & cleaning .....	<b>27</b>
3.7 Data analysis .....	<b>30</b>
3.8 Reliability and validity .....	<b>31</b>
3.9 Research ethics .....	<b>31</b>
<b>4. Results .....</b>	<b>33</b>
4.1 Pre-tests.....	<b>33</b>
4.2 Assumptions .....	<b>33</b>
4.3 Analysis.....	<b>34</b>
4.3.1 Typeface curvature → customer satisfaction and customer loyalty .....	34
4.3.2 Typeface curvature → hedonic experience and utilitarian experience .....	35
4.3.3 Hedonic and utilitarian experience → customer satisfaction and customer loyalty .....	35

4.3.4 Typeface curvature → hedonic and utilitarian experience → customer satisfaction and customer loyalty.....	38
<b>5. Conclusion &amp; Discussion .....</b>	<b>40</b>
5.1 Conclusion .....	40
5.2 Theoretical implications .....	40
5.3 Practical implications .....	41
5.4 Limitations .....	41
5.5 Further research avenues .....	43
<b>References.....</b>	<b>44</b>
<b>Appendices .....</b>	<b>55</b>
Appendix 1: Inclusion/exclusion criteria SLR .....	55
Appendix 2: Intercoder reliability calculation .....	57
Appendix 3: Scenario chat flows .....	57
Appendix 3a: Credence context – opening a bank account .....	57
Appendix 3b: Search context – making an appointment .....	58
Appendix 4: Typefaces pre-test .....	59
Appendix 5: Screenshots chatbot conversations .....	60
Appendix 6: Measurements .....	73

## 1. Introduction

The popularity of text-based communication like chatbots is rising (Choi & Aizawa, 2019), and people increasingly prefer messenger apps to communicate with organisations (Oracle, 2017). Organisations can use them to operate more efficiently and reduce costs, (Oracle, n.d.), and over fifty percent of people agree that an organisation should be available 24/7 (VentureBeat, 2017). In other words, chatbot communication is mutually beneficial for both organisations and customers. Chatbots can be described as “conversational agents providing access to information and services through interaction in everyday language” (Følstad et al., 2021, p. 2918) and the most used type is the task-oriented (declarative) chatbot (Oracle, n.d.). In 2017, chatbots already appeared every day in the western world and have grabbed attention from researchers (Candello et al., 2017).

In May 2018, the number of chatbots on Facebook Messenger has passed 300,000 (VentureBeat, 2018) and it is expected that ninety percent of queries in the healthcare and banking industries will be dealt with by chatbots in 2022 (CNBC, 2017). However, lack of awareness can be a threat to the growth of the chatbot market (de Cicco et al., 2020). So, with customer-organisation communication shifting from a human driven to a more technology dominant interface (Larivière et al., 2017), it is important to look at how chatbots can influence the reaction of customers during or before/after certain touchpoints with an organisation, which is called the customer experience (CX) (Araujo, 2018).

Based on the recent works of Becker and Jaakkola (2020) and De Keyser et al. (2020), CX is defined as spontaneous responses of certain quality, that are triggered at different touchpoints in a specific context. CX can be used by organisations to strengthen their customer-brand relationships (Trivedi, 2019) and it is an important driver for success and competitive advantage (e.g., Lemon & Verhoef, 2016; McColl-Kennedy et al., 2015). This makes CX an important marketing concept lately for both practitioners and academics (de Keyser et al., 2020). CX is a holistic concept involving the customer’s cognitive, affective, emotional, social, and physical responses (Verhoef et al., 2009) towards for example a brand, product or process. These responses can be divided into hedonic and utilitarian experiences (e.g., Babin et al., 1994; Picot-Coupey et al., 2021). Hedonic experiences are subjective and reflect for example affection, emotion, and entertainment, while utilitarian experiences cover the objective part of CX, being for example rational, instrumental, and task-related (Picot-Coupey et al., 2021). CX

should be approached in its holistic nature, addressing the hedonic and utilitarian elements simultaneously (Kranzbühler et al., 2018).

Outcomes of hedonic and utilitarian experiences are customer satisfaction and customer loyalty; hence these are influenced by hedonic and utilitarian experience (e.g., Blazevic & Sidaoui, 2022; Chitturi et al., 2008; Choi et al., 2021; Crolic et al., 2022). Customer loyalty is an important marketing aspect for organisations because it leads to, for example, higher (re-)purchase intention, willingness to pay, and willingness to recommend a service or organisation to others (Shankar et al., 2003). Customer satisfaction is often seen as an antecedent of customer loyalty or the relation between the two is described as reciprocal (e.g., Bodet, 2008; Shankar et al., 2003). However, both concepts also exist besides each other because a loyal customer is not necessarily satisfied and the other way around (Shankar et al., 2003).

While CX, customer satisfaction, and customer loyalty are topics with growing interests, chatbots come with the extra challenge to communicate information that would otherwise be transferred non-verbally (Choi & Aizawa, 2019). This means organisations need to find a way to obtain the same CX in a chatbot context as in a face-to-face situation, which can be done through various features that affect CX in a positive or negative way (e.g., Chang et al., 2016; González-Carrasco et al., 2019; Prentice & Nguyen, 2020; Trivedi, 2019). One of these features is typeface (e.g., Joško Brakus et al., 2009; Salgado-Montejo et al., 2014). In marketing research, typeface personalities and their effects on for example readability and emotions have often been topic of discussion (Choi & Aizawa, 2019). Typefaces act as carriers of attitudes and emotional feeling-tones (Tannenbaum et al., 1964) and contain different connotations and associations (Rolschau et al., 2020). Consequently, typefaces influence the way people perceive written text (Candello et al., 2017), and should be able to compensate for the lack of non-verbal communication.

One distinction that can be made between typefaces is the curvature, meaning if a typeface is round (i.e., curved, circular) or straight (i.e., not curved, angular) (e.g., Chen et al., 2021; van Leeuwen, 2006). Typeface curvature alone is enough to affect the perception of customers, thus influencing CX (Jiang et al., 2016). Previous research concludes that, in general, round shapes are associated more with positive emotions (e.g., Salgado-Montejo et al., 2014; Wang et al., 2020) and are preferred to straight shapes (Bar & Neta, 2006). Over more, angular typefaces are generally associated with sour taste, whereas people associate curved typefaces

with sweet tastes (e.g., Rolschau et al., 2020; Velasco et al., 2015). Typeface curvature is even able to influence customers' decision making processes, which can result in customers making other choices than they would naturally do (Rolschau et al., 2020).

Manipulating customer behaviour using curved or angular typefaces, opens opportunities to influence how customers experience an interaction. Besides, a highly relevant influence to consider in designing a chatbot, is the level of perceived risk during such an interaction. (Blazevic and Sidaoui, 2022). Perceived risk is an overarching concept of various specific types of risk, as well as the overall perceived risk (e.g., Bhatia & Breau, 2018; Girard & Dion, 2010; Jacoby & Kaplan, 1972; Lai-Ming Tam, 2012). Its moderating effect on CX, customer satisfaction and customer loyalty has already been found in previous research (e.g., Lai-Ming Tam, 2012; Trivedi, 2019).

### 1.1 Theoretical relevance and research question

Customer-organisation interaction is shifting from face-to-face conversations to chatbot conversations (Smutny & Schreiberova, 2020), and organisations should fully utilise every possibility to interact with their customers (e.g., McColl-Kennedy et al., 2015; Salgado-Montejo et al., 2014). Ergo, more knowledge is needed about customers' desires and needs that motivate them to use chatbots (Brandtzaeg and Følstad, 2018).

When looking at current theory on CX in a chatbot context, it appears that researchers mainly aim at utilitarian aspects (e.g., Babin et al., 1994b; Batra & Ahtola, 1990; Ryu et al., 2010), ignoring the hedonic side. The same applies to literature on typeface (Li & Suen, 2010). If research goes into the hedonic part of CX in a chatbot context, it is focused on the content rather than the form (Candello et al., 2017). Consequently, a research gap exists regarding the influence of typeface (curvature) on CX as a holistic concept in a chatbot context.

This research follows further research avenues on CX in an online context by approaching CX through customer satisfaction and customer loyalty, to gain better understanding of chatbot experiences (e.g., Jaakkola et al., 2015; Rose et al., 2011). This research intends to fill the current gap in the literature, by studying the effect of typeface curvature on customer satisfaction and customer loyalty, while regarding CX in its holistic nature by looking at both the utilitarian and hedonic experiences. This results in the following research question:



*What is the effect of typeface curvature used in a chatbot conversation on customer experience, and how is this effect influenced by perceived risk?*

To find the answer to the research question, this study will follow an experimental design, following up on existing research on typeface curvature, chatbots and CX (e.g., Crolic et al., 2022; Liu et al., 2018; Velasco et al., 2015; Wang et al., 2020). An experimental design is suitable for this study, because it makes it possible to research different conditions, varying in typeface curvature and level of perceived risk.

## 1.2 Managerial relevance

Typeface (curvature) can help organisations to deliver a certain message, or it can otherwise detract the intended message (Li & Suen, 2010). Knowing the effects of typeface curvature on CX outcomes (direct or indirect) like customer satisfaction and loyalty is important for managers because they are essential for gaining competitive advantage (e.g., Lemon & Verhoef, 2016; McColl-Kennedy et al., 2015) and influence a firm's profitability (Bodet, 2008). However, designers and developers face the major challenge of choosing the most appropriate typeface from the enormous number of options that are available nowadays (Holst-Larkin, 2006). Thus, understanding the desires and needs of customers interacting with a chatbot is important (Brandtzaeg & Følstad, 2018) to fully exploit the moments of interaction between the organisation and the customer.

## 1.3 Structure

To structure this research, the next chapter will go into the background of the different concepts and present an outline of existing theory on typeface curvature, hedonic and utilitarian CX, perceived risk, and customer satisfaction and customer loyalty. Thereafter the hypotheses and conceptual model will be presented. Chapter three will go into the research procedure and methodology, followed by the findings in chapter four. A conclusion and discussion that includes managerial implications, this research's limitations, and ideas for future research will wrap up the study.

## 2. Theoretical background

This chapter will provide an overview of the existing literature gathered through a systematic literature review (§3.1). The existing theory on the different core concepts will be discussed, being CX, customer satisfaction and customer loyalty, typeface curvature, and perceived risk. Thereafter, the control variables are discussed. Based on this overview of existing literature the different hypotheses are formulated, visually represented in the conceptual model (figure 2).

### 2.1 Customer Experience

Experiences happen at every moment in time. Experiences provide “sensory, emotional, cognitive, behavioural, and relational values that replace functional values” (Schmitt, 1999, p. 57). The experience economy is said to be the fourth economic stream after the agrarian, industrial and service economies, explained through various economic distinctions, for example by the nature of offering: “commodities are fungible, goods tangible, services intangible and experiences memorable” (see Pine & Gilmore, 1998, p.98 for full overview).

Over time, CX theory is revised and build upon by various researchers. As Jain et al. (2017) state, a shift from commoditisation to a personalised experience is happening; organisations are not just resellers of a product anymore, but their main task is to provide experiences along the customer journey. In other words, organisations cannot build on the transaction as only touchpoint or even just the product itself but have to take care of the whole process.

CX activities can be classified in three levels, being stimulus-based activity, interaction-based activity, and sense-making-based activities (Lipkin, 2016). Stimulus-based activities can be explained as the more traditional perspective, meaning that organisations offer certain stimuli that are passively responded to by customers (Mahr et al., 2019). Interaction-based activities can be seen as an extension of the stimulus-based activities, with the major difference that customers have overcome their passiveness and have a more active and subjective approach towards social interactions (Mahr et al., 2019). Lastly, sense-making-based activities see CX in its holistic and iterative nature, including both cognitive and affective processes (Mahr et al., 2019). Over time, CX theory has developed itself toward a definition that complies with the sense-making-based activities, acknowledging its holistic nature. Caused by the emergence of the internet, these sense-making-based activities nowadays take place not only offline, but online as well; causing consequences for e-marketers (Rose et al., 2011).

### 2.1.1 CX in a chatbot context

Where CX was triggered by offline face-to-face moments before, the internet in some cases reduced these moments to zero (Rose et al., 2011). This brings challenges, because a better CX is seen when customers interact with people (Kushwaha et al., 2021). Also, chatbots offer limited scope for customised communication which can lead to frustration (Prentice & Nguyen, 2020). Where in offline CX literature, emotional and subjective experiences have been acknowledged for a while (N. Hair et al., 2009), the focus in online CX is more on the cognitive and objective aspects. Online CX should also acknowledge the emotional and subjective side instead of only focusing on the cognitive and objective aspects (Rose et al., 2011).

### 2.1.2 Hedonic and utilitarian experiences

Emotional and subjective experiences can be described as hedonic experiences (Holbrook (1978). Hedonic experiences come from sensations derived from using products (Voss et al., 2003), and can also come forth from desire for sensory pleasure, variety and/or cognitive stimulation (Park et al., 1986). Holbrook & Hirschman (1982, p. 132) describe hedonic experiences under the header “fantasies, feelings and fun”, where Holbrook and O’shaughnessy (1984, p. 50) summarize emotion “as a process that involves the interaction between cognition (involving beliefs, values, and evaluation) and physiological changes producing feelings and desires”, building on various psychologists. More recently, Sidaoui et al. (2020) breaks down hedonic experience into three categories, being mood, which is present before an experience and can therefore influence the hedonic experience, emotions, which are present during the experience, described as counter-specific feelings, and hedonic value, which is context-specific and represents the feelings after the experience. Summarised, hedonic experiences cover the subjective side of CX and carry emotions that can affect choices of customers (Havlena & Holbrook, 1986).

As opposed to hedonic experiences, the cognitive and objective experiences are called utilitarian experience, and are derived from how specific products perform (Voss et al., 2003). Utilitarian experience covers the rational part of CX. Utilitarian experiences are referred to as factual content by Holbrook (1978, p. 547) as “logical, objectively verifiable descriptions of tangible product features”. Utilitarian experiences are sometimes addressed with terms that find their origin in evaluating work performance, and associated with accomplishment, success, and efficiency (Babin et al., 1994). Where hedonic experiences are more about the journey towards

the goal, utilitarian experience is driven by goal-oriented consumption, and by the desire to fill a need or to accomplish a functional task (Strahilevitz & Myers, 1998).

### 2.1.3 Customer satisfaction and customer loyalty

It is important for organisations to understand CX through chatbots from the customers' perspective (Kushwaha et al., 2021), because performance of chatbots and specifically its effect on CX can have implications for important marketing concepts like customer loyalty and satisfaction (Crollic et al., 2022). Especially when the chatbot contributes to service failure, satisfaction and loyalty can be negatively impacted (Choi et al., 2021). In this way, the benefits like cost reduction can be overshadowed by a negative CX and therefore lower satisfaction and loyalty (Blazevic & Sidaoui, 2022). Opposed, satisfied and loyal customers can be obtained by providing a superior CX (e.g., Grewal et al., 2009; Klaus & Maklan, 2012). So, organisations have an interest in putting time and effort in their chatbot design and how it influences customers and their experience. One design feature to consider is typeface selection.

## 2.2 Typeface

Typefaces can be explained as “a family of related fonts in a series of sizes” and are gaining importance with marketers to attract customers (Wang et al., 2020, p. 1118). The introduction of typeface research dates to at least 1923, when Poffenberger and Franken found that different typefaces vary in appropriateness, which can be felt by ‘judges’ (in this case the customers), concluding that typeface cannot be neglected in marketing. Also, a cautious, first link is established with the ‘character of their lines’ and a certain ‘atmosphere’ the typeface might carry (Poffenberger & Franken, 1923). Moreover, typefaces act as carriers of ‘connotative meaning’, described as “attitudes and emotional feeling-tones” (Tannenbaum et al., 1964). The importance of typeface selection is highlighted by Tantillo et al. (1995), who found that typeface characteristics link to traits like elegance, emotion, beauty, happiness, legibility, masculinity, and readability. More recently, researchers have gone into depth in how typeface exactly influences CX, and one of these findings is through the typeface’s curvature.

### 2.2.1 Typeface curvature

Typeface curvature can most simply be defined as the typeface being either curved, or angular (e.g., Chen et al., 2021; van Leeuwen, 2006). Typeface curvature can be described in terms of the terminal being smooth or sharp, where smooth terminals indicate a round typeface with

high curvature, and sharp terminals indicate an angular typeface with low curvature (Wang et al., 2020). The difference between high and low curvature is shown in figure 1.

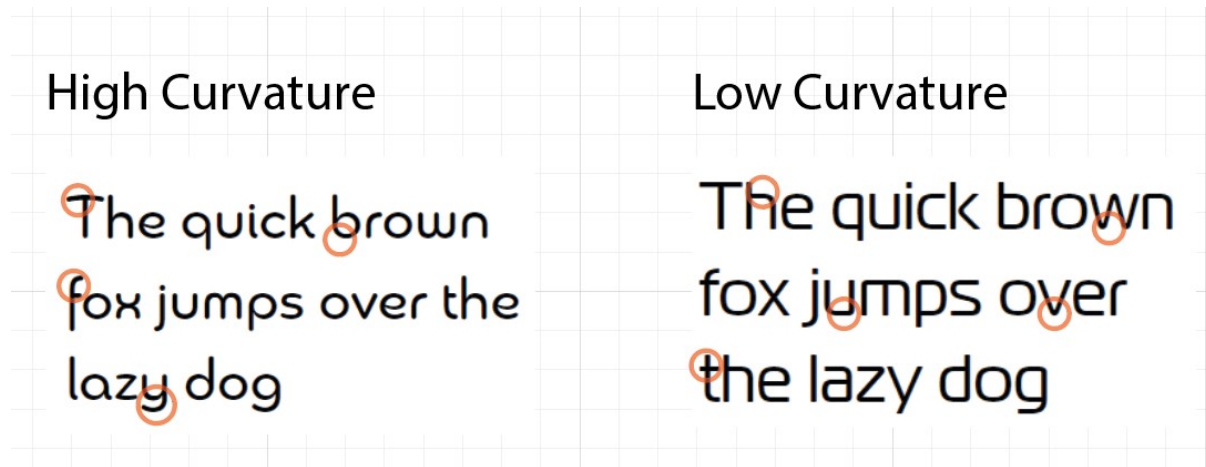


Figure 1: high vs. low typeface curvature

People associate angular shapes with unpleasantness, opposing to rounded shapes with pleasantness (Larson et al., 2012). Also, Westerman et al. (2013) find support that rounded designs are preferred (over angular designs). Back in 1924, Poffenberger and Barrows already stated that “straight lines will always express rigidity and stiffness while curves will express some sort of growth or motion” (p. 187). Hevneb (1935) found that “curves are found to be serene, graceful, and tender-sentimental, and angles are robust, vigorous and more dignified” (p. 398). In addition, curvature can evoke associations with femininity (curved typeface), and masculinity (angular typeface) (e.g., Kastl & Child, 1968; Lieven et al., 2015). In a taste context, round typefaces are associated with sweeter tastes compared to angular typefaces (Velasco et al., 2014). Salgado-Montejo et al. (2014) expect that general theory of curved and angular designs on CX will also apply to typeface curvature effects and Wang et al. (2020) state that experiential associations with round objects can be paralleled to curved typefaces. Ultimately, typeface curvature has an impact on people’s hedonic and sensory experience (de Sousa et al., 2020), as well as on utilitarian experience (Schroll et al., 2018). This impact is influenced by the perceived uncertainty of need by customers, which is often present in chatbot conversations (Blazevic & Sidaoui, 2022).

### 2.3 Perceived risk

The level of perceived uncertainty and need, is called perceived risk (Dowling & Staelin, 1994). Perceived risk comes in three different levels according to the SEC framework of Girard & Dion (2010), differentiating search, experience, and credence (SEC) levels of perceived risk.

This paper will distinguish between the two extremes of the framework, being search and credence services. The lowest level in the SEC-framework is search, with relatively easy access to information during the interaction (Girard & Dion, 2010), for example consulting a banking chatbot about the opening hours (Blazevic & Sidaoui, 2022). Credence services illustrate interactions where information cannot easily be obtained (Girard & Dion, 2010) and evaluation of the interaction is difficult for the customer (Park et al., 2021), for example when there is uncertainty about how sensitive information is handled. Perceived risk consists of six dimensions, being: 1) financial risk, 2) performance risk, 3) physical risk, 4) psychological risk, 5) social risk, and 6) time/convenience risk (e.g., Girard & Dion, 2010; Jacoby & Kaplan, 1972; Roselius, 1971). Due to the technological developments of the last years, more personal data is collected, including the risk of privacy violations, called perceived privacy risk (Bhatia & Breaux, 2018). Especially in a chatbot setting, including online data collection and storage, perceived privacy risk is increasingly relevant.

## 2.4 Hypotheses

### 2.4.1 Direct effect of typeface curvature on customer satisfaction and customer loyalty

Theory about curvature of typeface specifically states that curved typefaces “convey the moods expressed by the adjective sets sprightly, sparkling, dreamy, calm and soaring while angular typeface conveys the adjective set dignified” (Kastl & Child, 1968, p. 443). Also, Westerman et al. (2012) confirm that typeface curvature can influence important CX outcomes. The findings of Westerman et al. (2012) indicate that there might be an effect of typeface curvature on customer satisfaction and customer loyalty, while Kastl & Child (1968) trigger the assumption that this effect is positive for both curved and angular typefaces, since the adjective sets they evoke can both be considered as positive. Therefore, the following hypothesis is formulated:

*H1: Both curved and angular typefaces will result in higher customer satisfaction and customer loyalty.*

### 2.4.2 Mediating effect of hedonic and utilitarian experiences

Suci et al. (2021) and Wang et al. (2020) have found that (packaging with) round typefaces elicit preference towards products that encounter hedonic experiences. Also, typefaces are known to influence different hedonic values based on its features (Hazlett et al., 2013). Also, curved typefaces create a more human-like perception in chatbot interactions (Tassiello et al.,

2018). Schroll et al. (2018) find that handwritten (mostly round) typefaces are related to hedonic products, as opposed to machine-written (mostly angular) typefaces that evoke more utilitarian experiences. However, it must be noted that not all round typefaces are handwritten and not all angular typefaces are machine written (Wang et al., 2020). Consecutively, Mackiewicz & Moeller (2004) find that curves of letters distract and decrease legibility, while angular typefaces are more readable and better suitable for technical and professional contexts, contributing to the functional attitude of utilitarian experience. Liu et al. (2018) have measured the impact of curved and angular shapes on customer satisfaction and customer loyalty in busy and non-busy settings, finding that in a busy setting, angular shapes lead to more customer satisfaction and customer loyalty, whereas in a non-busy setting, curved shapes lead to more customer satisfaction and customer loyalty. Possibly, because people in a busy setting are more focused on the outcome (utilitarian), while in a non-busy setting, people have more time to enjoy the experience itself (hedonic). Chitturi et al. (2008) have found in their research that products exceeding customers' utilitarian needs result in customer satisfaction, while products exceeding customers' hedonic needs ultimately result in customer loyalty. This leads to the following hypotheses:

*H2: The influence of typeface curvature on customer satisfaction and customer loyalty is positively mediated by customer experience.*

*H2a: Curved typefaces will have a positive influence on the hedonic experience.*

*H2b: Angular typefaces will have a positive influence on the utilitarian experience.*

*H2c: Hedonic experience will have a positive influence on customer loyalty.*

*H2d: Utilitarian experience will have a positive influence on customer satisfaction.*

### 2.4.3 Moderating effect of perceived risk

In a credence context, it is expected that customers are more in need of an emotional sensitive (hedonic) connection with a chatbot (e.g., Blazevic & Sidaoui, 2022; Crolc et al., 2022; Sidaoui et al., 2020). Opposed, a search context will be less complicated and lower risk is expected to be perceived (Blazevic & Sidaoui, 2022). Chatbot conversations in a search context are therefore expected to be more of a functional (utilitarian) nature. This leads to the following hypotheses:

*H3a: Perceived risk will have a positively moderating effect on the direct effect of typeface curvature on customer satisfaction and loyalty.*



*H3b: Perceived risk will have a positively moderating effect on the direct effect of typeface curvature on hedonic and utilitarian experience*

*H3c: Perceived risk will have a positively moderating effect on the direct effect of hedonic and utilitarian experience on customer satisfaction and customer loyalty*

*H3d: Perceived risk will have a positively moderating effect on the indirect effect of typeface curvature on customer satisfaction and customer loyalty*

*H3e: The effect of angular typefaces on utilitarian experience will be more significant in a search context than in a credence context.*

*H3f: The effect of curved typefaces on hedonic experience will be more significant in a credence context than in a search context.*

## **2.5 Control variables**

As Brumberger (2003) states, people do not just passively receive presented information. Also, it is important to use control variables to cover for practical difficulties in experimental designs (Bernierth & Aguinis, 2016). It is therefore important to take different control variables into account to get unbiased results. In this paragraph the control variables will be presented.

Morris and Venkatesh (2000) assume that age can influence the adoption of technology, which can assumingly be explained by younger people getting acquainted with technology at an earlier age, say elementary school, whereas older people might have finished high school or college when certain technology became widely available. Since chatbots are a relatively recent innovation, it is suspected that age will influence the way people experience a chatbot (conversation) and is therefore controlled for in this research.

Typeface curvature is associated with femininity and masculinity (Kastl and Child, 1968; Lieven et al., 2015). Because in this research the difference in effect between curved and angular typeface is tested, gender is a relevant variable to control for, since it can affect the outcomes of this research.

In his research, Abu-Shanab (2011) finds evidence that educational level significantly influences the acceptance of technology. Building on this finding, it seems reasonable that educational level could influence the effect of how people experience a certain chatbot (conversation).



Since the experiment will be in the English language, it is important to know what the level of English level of the respondents is. If people cannot fully understand the conversation they are shown, it is harder to understand it and the experience might be different than for people who fully master the English language.

The experiment must deal with the personal preferences of the respondent. The personal preference for typeface curvature might be related to, for example, the difficulty of processing them for different people (Velasco et al., 2015), which is part of the utilitarian experience.

Attitude towards technology is mentioned in various self-service technologies (e.g., chatbots) and is mentioned in Davis' (1989) technology acceptance model (Blut et al., 2016). In the light of this research, it basically refers to the intention a person has, to using the chatbot in comparison to face-to-face service, in line with Davis (1989). Also, Davis (1989) states that attitude towards chatbots is formed regardless of its design and implementation features.

Interactions with verbal and visual language (like in chatbots) will be shaped by factors like prior knowledge, expectations, and experiences of respondents (Brumberger, 2003). Also, Ischen et al. (2020) have found that people experience chatbots different based on their familiarity, which relates to how often they have interacted with a chatbot. Therefore, it is valuable to measure if respondents have interacted with a chatbot before and how often they have done so, to control for any bias caused by prior experience.

CX is a holistic concept not only happening during an interaction, but consists of feelings that occur before, during, and after an interaction (Sidaoui et al., 2020). This research is focused on how people feel after they have had an experience with a chatbot, but how people experience it, is influenced by the mood of a person before encountering the experience (e.g., Fox, 2018; Ismail et al., 2011; Sidaoui et al., 2020). Mood is a state that occurs for a relatively longer period (hours, days, weeks) (Fox, 2018). A positive mood is found to lead to a more positive experience (Mano & Oliver, 1993), whereas a negative mood might lead to a more negative experience (Mattila & Wirtz, 2000). To control for any bias caused by the mood of the respondents, the mood before the experiment will be measured.

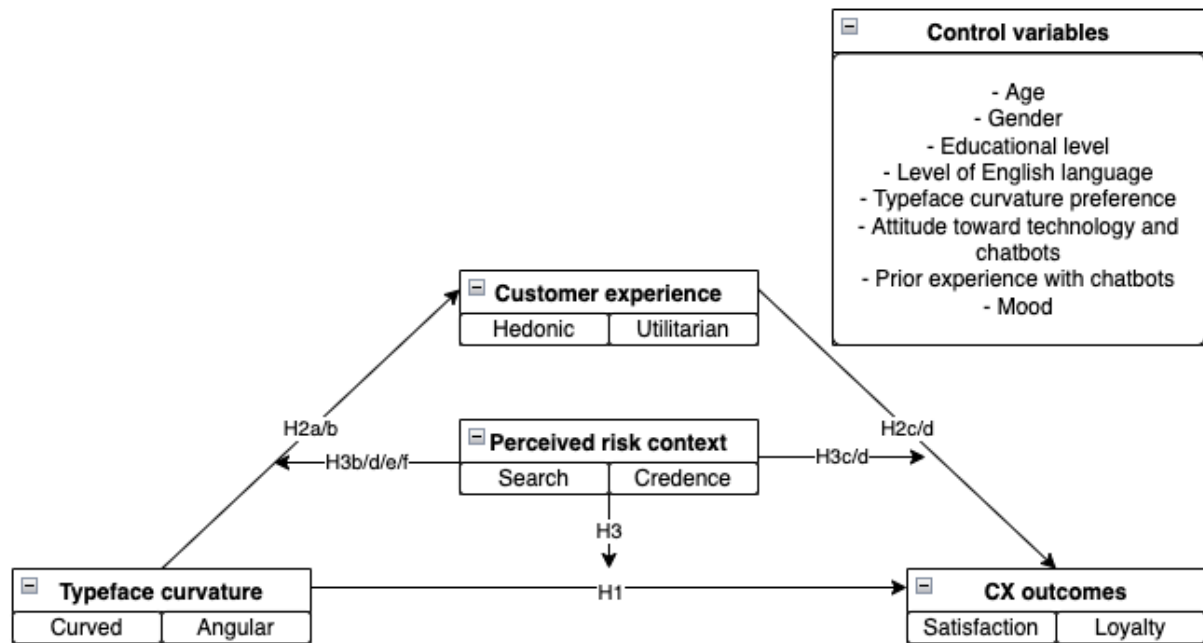


Figure 2: Conceptual model

### 3. Methodology

#### 3.1 Systematic literature review

In this section the process of the systematic literature review (SLR) will be set out. A SLR is defined as “a literature review that is designed to locate, appraise, and synthesize the best available evidence relating to a specific research question to provide informative and evidence-based answers” and is the gold standard for literature synthesis (Dickson et al., 2017, p. 3).

The SLR was conducted by four independent researchers, who worked on the same general research topic focusing on finding a link between typeface and CX, preferably in a chatbot/digital setting. To take a best attempt to gathering the existing theory a search term was designed, which can be found in the PRISMA flow diagram in figure 3 (Page et al., 2021). The search was conducted using the search engine Scopus (Elsevier, n.d.), which is said to have the largest abstract peer-reviewed database (Enago, 2021). The group of researchers agreed on various inclusion and exclusion criteria (appendix 1) before the search and then ran the search. The search resulted in 618 peer-reviewed articles that were divided into two equal halves of 309 articles to be reviewed by two researchers each. The articles were screened on their title and abstract to decide if they were relevant or not. The differences in judgements about articles were reviewed, to ensure intercoder reliability. Intercoder reliability is used to measure the agreement among multiple coders, to evaluate if the coders have made similar judgements, to test for any bias in the results of coding (MacPhail et al., 2016). The intercoder reliability can be found in appendix 2. This review resulted in 153 articles that were left over and subjected to a more in-depth review. This was done by all independent researchers individually, using the same inclusion and exclusion terms as in step one. However, due to the different research focuses at that moment, individual criteria were added and acted upon. After the second screening, I included 41 articles and excluded 112. Besides the articles gathered through the SLR, an extra 82 articles were used in this research that were found in different databases.

The following search term was used for the SLR, with the corresponding PRISMA flow diagram:

**Search term:** TITLE-ABS-KEY ( ( typeface\* OR font OR fonts OR "font style\*" OR typography OR "serif\*" OR "font shape" ) AND ( "customer experience\*" OR "consumer experience\*" OR "user experience\*" OR "emotion\*" OR "hedonic" OR "utilitarian" OR "trust"

OR "affect" OR "perception" OR "conversational agent\*" OR "chatbot\*" OR "robot\*" ) ) AND ( LIMIT-TO ( SRCTYPE,"j" ) ) AND ( LIMIT-TO ( SUBJAREA,"COMP" ) OR LIMIT-TO ( SUBJAREA,"PSYC" ) OR LIMIT-TO ( SUBJAREA,"BUSI" ) OR LIMIT-TO ( SUBJAREA,"ARTS" ) OR LIMIT-TO ( SUBJAREA,"SOCI" ) OR LIMIT-TO ( SUBJAREA,"NEUR" ) ) AND ( LIMIT-TO ( LANGUAGE,"English" ) ) AND ( LIMIT-TO ( DOCTYPE,"ar" ) )

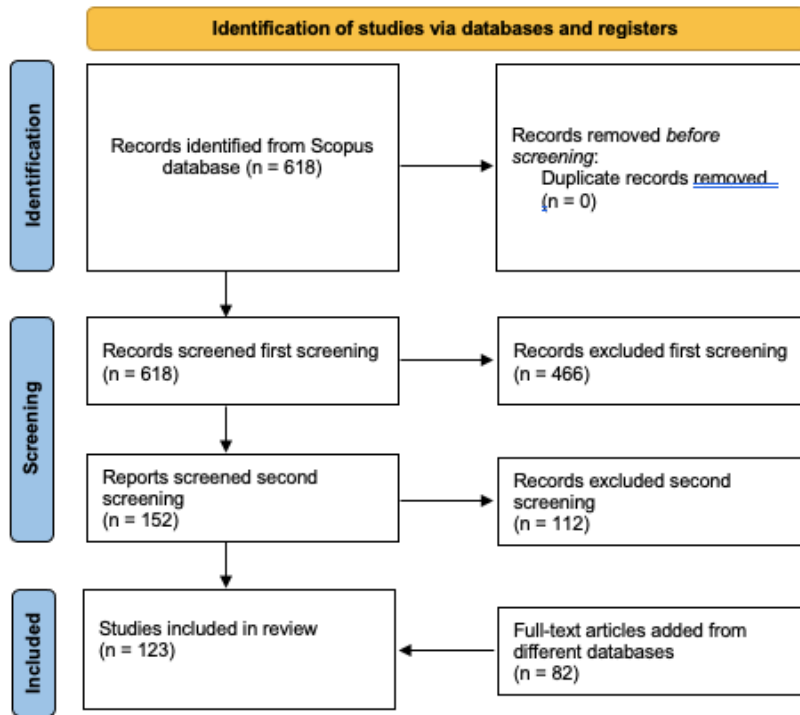


Figure 3: PRISMA flow diagram (Page et al., 2021)

### 3.2 Experiment

The research that is conducted in this thesis is quantitative and is designed as an experiment and a survey. Experimental designs are used to compare different situations (conditions) in which a proposed cause is either present or absent (Field, 2013). Four independent researchers worked together on four different conditions, varying in context (credence vs. search) and typeface curvature (curved vs. angular), making an experiment the accurate way of gathering data. The survey that was presented after the experiment, contained questions that cover all the concepts that are studied by the four researchers. This made it possible to research CX in its holistic nature, and we could all benefit from all respondents. This specific research mainly focuses on the outcomes of CX, being customer satisfaction and customer loyalty. Beside the direct effect of typeface curvature on customer satisfaction and customer loyalty, this research

will also examine the indirect effect mediated by hedonic and utilitarian experiences, as well as the moderation of perceived risk. Before the main experiment could be designed, two pre-tests had to be executed on the context (perceived risk) and typeface curvature.

### 3.2.1 Pre-tests

In the first pre-test was checked if the scenarios used led to the intended level of perceived risk. Two scenarios were presented, one with low perceived risk (search) and one with high perceived risk (credence). The scenarios can be found in appendix 3. Based on the article of Girard & Dion (2010), the respondents were asked to rate the overall perceived risk by answering the question *‘Based on the scenario that you just saw; how risky do you feel it would be for you to interact with the chatbot?’* on a 5-point scale (1 = not risky at all, 2 = little risky, 3 = neutral, 4 = risky, 5 = extremely risky) and the specific perceived risk by answering the questions *‘Based on the scenario that you just saw; how likely does it feel for you that the interaction with the chatbot can lead to a loss of: 1) financial risk involved (financial risk), 2) performance failure of the chatbot (performance risk), 3) the time involved in solving problems with the chatbot features (time risk), and 4) the way that is dealt with your privacy regarding the information and documents you have sent to your chatbot (privacy risk)’* on a 5-point scale (1= extremely unlikely, 2 = somewhat unlikely, 3 = neither likely nor unlikely, 4 = somewhat likely, 5 = extremely likely). Since the questions from Girard & Dion (2010) are originally designed for measuring the purchase of a product/service, the questions were slightly adjusted, without altering the fundament.

In the second pre-test was checked if the typefaces that are evaluated as round or angular according to the theory of Wang et al. (2020) (figure 1) are perceived as round or angular by the respondents as well. The text ‘The quick brown fox jumps over the lazy dog’ was chosen because it is a pangram – it contains all letters of the alphabet and is therefore widely used to show the difference between typefaces (Kulahcioglu & de Melo, 2021). This sentence was shown in twelve different typefaces from Google Fonts (Google, n.d.), either with sharp terminals or rounded terminals (Dongle, Dosis, Gayathri, Josefin Sans, Khand, Nunito, Open Sans, Poppins, Quicksand, Roboto, Smooch Sans, and Varela Round, see appendix 4 for a visual representation of the typefaces). To avoid bias induced by other factors, we tried to select typefaces that differ the least in other typeface design characteristics. Unfortunately, it is to the best of our knowledge impossible to compare typefaces that only differ in curvature and not in

any other characteristic. To avoid bias, no theory about curvature was presented to the respondents. The typefaces are shown one by one to prevent comparison by the respondents, with the question ‘*What is the level of curvature of this typeface?*’. The respondents rated the typeface curvature on a 7-point Likert scale, where 1 = very low curvature and 7 = very high curvature. Ultimately, the typeface with the least curvature and the typeface with the highest curvature were used for the main experiment as round and angular typeface.

### 3.2.2 Main experiment

In line with the results of the pre-test, the two scenarios mentioned before were used for the main experiment as well (appendix 3). In comparison to the pre-test, respondents were not shown an explanation of the scenario, but they received the minimal needed information beforehand because this could bias the respondents, for example by the typeface used in the information text. The rest of the situation was presented as part of the chatbot conversation. To keep the scenario as realistic as possible, a screen recording video of the conversation was shown, as if the respondent was following a live conversation.

To create the chatbot conversations the website Botnation.AI (Botnation.AI, n.d.) was used. This website provides a non-coded way to build and test a chatbot conversation. Most importantly, Botnation.AI provides the opportunity to change the typeface to the round and angular typefaces that resulted from the pre-test, while retaining all the other design features. The complete chat flow of both conversations can be found in appendix 5, in the form of screenshots so the complete ambiance of the experiment is clearly visible.

During the experiment, the respondents were shown a video of one of the chatbot conversations, the conversation in the search context or in the credence context. Which video was shown to the respondent was assigned randomly, to ensure the experiment was as unbiased as possible (Vennix, 2019). The assigned conversation was shown in either the round typeface or angular typeface, also assigned randomly. Through an option in Qualtrics, the survey software used, we made sure that all four conditions were assigned equally (Qualtrics, n.d.). The rest of the video was completely identical, as to avoid any bias caused by different factors. After each conversation, the respondents were asked a set of questions, on which more information can be found in appendix 6.

### 3.2.3 Data collection

The data for this research was collected via an online experiment and survey using the Qualtrics software (Qualtrics, n.d.). The survey was accessible for everyone with an internet connection on for example their smartphone, laptop, or tablet. The survey was spread mostly through social media like LinkedIn, Facebook, Instagram, and WhatsApp. Complementary, respondents were contacted face to face. To boost our number of respondents, we posted our survey on SurveyCircle (SurveyCircle, n.d.) and SurveySwap (SurveySwap, n.d.). These platforms are based on mutual interest and benefit, where participation in surveys from peers should lead to them participating in our survey as well.

### 3.3 Sample

The sample targeted for this research is anyone with an age of 18 or older. This is because from this age, people are responsible for their own finances in most countries, so the chatbot conversations seem realistic to them. Because the survey was distributed by researchers from different countries (The Netherlands, Mexico, and Greece), the nationality of respondents might vary, but this is unknown.

In total, 423 respondents started the survey. However, it was finished by only 324 valid and complete respondents. From these respondents, 49.1% were male, 50.3% female and 0.6% replied with 'other'. The mean age of the respondents is 27 years old. Regarding the conditions, these were considerably equally distributed: 85 (curved and credence), 74 (curved and search), 85 (angular and credence), and 80 (angular and search). The above mentioned statistics can be found in appendix 7a.

Regarding the statistical rules about sample size with MANOVA analysis, Hair et al. (2019) state that as a bare minimum, the sample size per cell (condition) should be at least larger than the number of dependent variables. Recommended sample size for MANOVA is however twenty, and preferably thirty respondents per cell, which was easily met in this research, since the minimum cell size is 74 (Hair et al., 2019). Based on the sample size and number of cells, the maximum number of covariates was calculated, which results in  $(.10 * 324) - (4 - 1) = 29$  (Hair et al., 2019), so all 9 covariates could be included in the analysis.

Regarding the sample size for the multiple regression analysis, a minimum ratio of 5:1 is used by Hair et al. (2019). Preferably, 15-20 respondents per independent variable is desired. with  $N = 324$  and thirteen independent variables, this study reaches a ration of 25:1, which means the sample size is large enough to generalise the results.

### 3.4 Measurements

In the following sections the scales that were used to measure the constructs are set out. A summary of the concepts can be found in the operationalisation in §3.5 (table 1). The exact questions asked to the respondents can be found in appendix 6. Noteworthy is that some additional questions were part of the survey, since the experiment was conducted together with other researchers who used overlapping, but also different measures. These questions were about legibility, perceived warmth, and trust, which are not part of this research. Therefore, those questions are not shown in appendix 6.

To measure CX through the distinction between hedonic and utilitarian experiences, Voss et al. (2003) have generated a ten-item scale called HED/UT, which is reliable, valid, generalisable and useful. The HED/UT scale successfully performs in multiple tests of criterion and discriminant validity (Voss et al., 2003). Another benefit of the HED/UT scale is that it only takes ten items to measure both hedonic and utilitarian experiences. Van der Heijden & Sørensen (2003) state that the original scale is generally applicable to all services, so it should be suitable for chatbot contexts as well.

In line with Ashfaq et al. (2020), the seven-point bipolar scale was used, adapted from Oghuma et al. (2016) that consists of four bipolar items to measure customer satisfaction, and the continuance intention scale of (Bhattacharjee, 2001) to measure customer loyalty. Customer loyalty was measured through the questions used by Ashfaq et al. (2020).

For the measurement of the perceived risk, the questions were based on the SEC-framework of Girard & Dion (2010). The SEC-framework focuses on both products and services (Girard & Dion, 2010), so should be generalisable for chatbots as well. The questions were reformulated to fit the chatbot context. Also, a question about privacy risk was added due to its increasing relevance and physical, psychological and social risk were excluded from the survey due to irrelevance in a banking chatbot context.



The minimum age to participate in the experiment was eighteen years old. Eighteen years old is chosen as starting age because in the Netherlands, it is the age at which people become responsible for their own finances and, in the light of research ethics (on which more in §3.9), we excluded minors from our research.

Gender was measured on a nominal scale with four options: male, female, other, and people could choose to not share their gender if they did not want to.

To measure the educational level, the Dutch school system was used, and the question focused on finished education, so a degree in that level must be obtained. The scale goes from primary school to a finished PhD.

To measure the level of English language, the scale of the Common European Framework of Reference for Languages (CEFR) was used, which organises the proficiency of a language, in this case the English language, in six levels among three categories: basic user, independent user and proficient user (Council of Europe, n.d.). The three broader categories were used to keep it understandable for the respondents, because not all respondents might be familiar with the specific categories.

The curvature preference of respondents was measured through the custom typefaces that were used in the research of Velasco et al. (2015). Unfortunately, these custom typefaces could not be used freely for this research, so the respondents were shown a screenshot of the typefaces, asking to rate them on a 7-point Likert scale from strongly like (1) to strongly dislike (7).

To measure the attitude toward technology the scale of Davis (1989) was used. This scale measures the preference to encounter services digitally in comparison to face to face. The scale was expanded with a question regarding the intention to use a chatbot specifically in comparison to face to face contact. Both items were scored on a 7-point Likert scale.

To measure the prior experience, the question from Ashfaq et al. (2020) was used. Additionally, how often a respondent has interacted (if applicable) was measured in four categories.

To measure the mood before the experiment, the first question of the mood short form scale from Peterson & Sauber (1983) was used as it is described by Sidaoui et al. (2020). The first question measures the overall mood as extremely negative vs. extremely positive on a 5-point Likert scale. The rest of the scale was left out to prevent the survey from being too long, and since mood is not one of the main concepts measured.

### 3.5 Operationalisation

Main model	Measurement description	Measurement level	Author(s)
CX – utilitarian experience	HED/UT scale: ten items on a 7-point semantic differential scale	Interval	Voss et al., 2003
CX – hedonic experience	HED/UT scale: ten items on a 7-point semantic differential scale	Interval	Voss et al., 2003
Perceived risk	SEC-scale: 5-point scale	Interval	Girard & Dion, 2010
Customer satisfaction	7-point bipolar scale containing four bipolar items	Interval	Oghuma et al., 2016
Customer loyalty	Continuance intention: 7-point Likert scale	Interval	Ashfaq et al., 2020; Bhattacharjee, 2001
<b>Control variables</b>			
Age	Ranges of 5 years from 18 up to 90+	Interval	-
Gender	Male, female, other, would rather not say	Nominal	-
Educational level	Primary school – PhD	Nominal	-
Level of English language	CEFR scale	Nominal	Council of Europe, n.d.
Typeface curvature preference	Like/dislike, 7-point Likert scale	Interval	Velasco et al., 2015

Attitude towards technology/chatbots	Agree/disagreed, 7-point Likert scale	Interval	Davis, 1989
Prior experience with chatbots	Yes, no, I don't know  1-3 times per year 4-9 times per year 10-15 times per year > 15 times per year	Nominal	Ashfaq et al., 2020
Mood	Mood short form: 5-point scale	Interval	Peterson and Sauber, 1983 (as described in Sidaoui et al., 2020)

Table 1: operationalisation

### 3.6 Data preparation & cleaning

The missing value analysis (appendix 7a) clearly shows that respondents quitted the survey before the end. All respondents that did not complete the survey were deleted from the dataset. This leaves a remaining 324 respondents that are included in the analysis.

To prepare the dataset for analysis, dummy variables had to be created for some items. These items were: past experience, gender, education level, language level, and condition. Also, the item Hedonic\_Experience\_5 was reverse-coded.

To reduce the amount of data, factor analysis is conducted. With factor analysis, different clusters of variables are identified, and the amount of data can be reduced without losing too much of the original data (Field, 2013). To maximise factor loadings, factor rotation is applied. In the case of this research, oblique (direct oblimin) rotation is used, because the underlying variables are expected to correlate since multiple questions are supposed to measure the same variable. To check this, the factor analysis is conducted with oblique rotation, leading to absolute values of  $> 0.32$  in the component correlation matrix (appendix 7b), meaning oblique rotation is indeed the right choice for this data. Furthermore,  $KMO > .80$  and Bartlett's test of sphericity is significant ( $p < .05$ ) (appendix 7c) which means the sample size is suitable for the factor analysis (Field, 2013).

The pattern matrix showed that Perceived\_Risk1 cross loaded on both factor 3 and 5, which led to deletion of the item. The analysis was conducted again, showing Hedonic\_Experience\_5 did not meet the threshold of .40 so this item was deleted.

In the next analysis, five factors had eigenvalues above 1 and in combination explained 77.60% of the variance, so five factors will be retained (appendix 7d). In table 2 the rotated factor loadings can be found. The items that cluster on the same factor suggest that factor 1 represents customer satisfaction, factor 2 represents hedonic experience, factor 3 represents perceived risk, factor 4 represents utilitarian experience and factor 5 represents customer loyalty. The output of the pattern matrix can be found in appendix 7e.

To test the reliability of the scales, Cronbach's alpha was calculated per scale (appendix 7f). The  $\alpha$  can also be found in table 2. Customer satisfaction has a high reliability ( $\alpha = .95$ ) and deletion of any item would not lead to a higher  $\alpha$ . Hedonic experience has a high reliability ( $\alpha = .92$ ) and deletion of any item would not lead to a higher  $\alpha$ . Perceived risk has an acceptable reliability ( $\alpha = .66$ ) and deletion of any item would not lead to a higher  $\alpha$ . Utilitarian experience has a high reliability ( $\alpha = .94$ ), which could have been increased to  $\alpha = .96$  if Utilitarian\_Experience\_4 was deleted. However, the reliability with this item included is already very high and deleting the item would lead to a decrease in variance of the scale from 69.69 to 51.86. For this reason, the item was not deleted. Loyalty has a high reliability ( $\alpha = .91$ ) and deletion of items would not lead to an increase in  $\alpha$ .

	Customer satisfaction	Hedonic experience	Perceived risk	Utilitarian experience	Customer loyalty
Very frustrated/ very contended	.97				
Very dissatisfied/very satisfied	.88				
Very displeased/ very pleased	.87				
Very unpleasant/ very pleasant	.80				

Not thrilling/ thrilling		.93			
Dull/ exciting		.89			
Not fun/ fun		.87			
Not delightful/ delightful		.76			
Privacy risk			.74		
Performance risk			.72		
Time risk			.68		
Financial risk			.64		
Functional/ not functional				.94	
Effective/ ineffective				.93	
Helpful/ unhelpful				.92	
Practical/ impractical				.90	
Necessary/ unnecessary				.67	
Intention to use a chatbot like this in the future					.90
Will always try to use a chatbot like this if possible					.85
Will strongly recommend others to use this chatbot					.82
Eigenvalues	7.97	3.04	2.22	1.30	1.01
% of variance	39.84	15.19	11.09	6.45	5.04
$\alpha$	.95	.92	.66	.94	.91

Table 2: rotated factor loadings, eigenvalues, % of variance and  $\alpha$  (N= 324)

To create new variables for the five factors, the average scores on the specific items were added up and divided by the number of items, to create a variable for each factor consisting of the mean score of the items. This led to the following variables:

$$\begin{aligned}
Hedonic_{Experience} &= \frac{HX1 + HX2 + HX3 + HX4}{4} \\
Utilitarian_{Experience} &= \frac{UX1 + UX2 + UX3 + UX4 + UX5}{5} \\
Perceived_{Risk} &= \frac{PR1 + PR2 + PR3 + PR4}{4} \\
Customer_{Satisfaction} &= \frac{CS1 + CS2 + CS3 + CS4}{4} \\
Customer_{Loyalty} &= \frac{L1 + L2 + L3}{3}
\end{aligned}$$

Also, the average of the attitude towards technology items was taken, leading to the following equation:  $Attitude = \frac{A1+A2}{2}$

To check if the respondents interpreted the manipulations as intended, a manipulation check was conducted. This was done through an independent t-test (appendix 7g). This analysis shows that Levene's test is not significant ( $p > .01$ ), and the difference between the credence and search context is significant ( $t(322) = 5.03, p < .01$ ). On average, respondents perceived the credence context as riskier ( $M = 3.10, SE = 0.06$ ) than the search context ( $M = 2.69, SE = 0.06$ ). This shows that the manipulation worked out as planned.

### 3.7 Data analysis

To analyse the results of the experiment, MANCOVA was used. MANCOVA is an extension of AN(C)OVA, which is the most used method to analyse experiments (Hair et al., 2019). The difference between AN(C)OVA and MAN(C)OVA is that the latter accommodates more than one dependent variable. The inclusion of covariates (the 'C') is needed because this research includes a moderation effect, as well as several control variables. MAN(C)OVA is used to measure differences between different conditions, like in the experiment that was analysed in this research. The most important condition for MANCOVA is that the dependent variables should be measured at a continuous level, and the independent variable should consist of categorical variables/groups, which is the case for this experiment. To analyse the effect of hedonic and utilitarian experience on customer satisfaction and customer loyalty, multiple regression analysis was used, since hedonic and utilitarian experience are, in this case, metric independent variables. Multiple regression analysis is also used to measure the mediation effect

and the moderated mediation effect, since this is not possible with MANCOVA. For all the multiple regression analyses, the PROCESS macro for SPSS was used (Hayes, 2017)

Additionally, some assumptions must be met, being independence, equality of variance-covariance matrices, normality, and linearity and multicollinearity among the dependent variables for MANOVA (Hair et al., 2019), and linearity, constant variance of the error terms, normality of the error term distribution, independence of the error terms, and multicollinearity for multiple regression analysis (Hair et al., 2019). These assumptions for MANCOVA and multiple regression analysis were tested through the same tests, only to test for multicollinearity in the multiple regression analysis and extra test was conducted.

### 3.8 Reliability and validity

Reliability and validity are both important instruments to make certain research a useful contribution to the existing theory, and it is a way to minimise measurement error (Field, 2013). Reliability shows if research is repeatable, meaning it will lead to generally the same results if tested again (Field, 2013). Validity concerns if what is measured corresponds with what it should measure (Field, 2013), and consists of internal and external validity (Vennix, 2019). Since this research used scales that are proven to measure the concepts they are applied to, internal validity was secured (Vennix, 2019). External validity could unfortunately not be secured, because only non-probability sampling techniques were used (Field, 2013). In this research convenience sampling (through the own network of the researcher) and voluntary response sampling (through the open internet platforms) were used. Also, a little bit of snowball sampling was used (through friends of friends). To sustain external validity, probability samplings methods should have been utilised (Field, 2013). To increase the reliability of the experiment, the conversation was completely manipulated, including the messages of the customer. In this way we made sure that every respondent was confronted with the exact same information and text, and the experiment can easily be repeated. Reliability of the scales is tested through Cronbach's  $\alpha$ , as can be seen in table 2.

### 3.9 Research ethics

Throughout this research, the APA Ethical Principles of Psychologists and Code of Conduct were followed, consisting of the following five general principles: beneficence and nonmaleficence, fidelity and responsibility, integrity, justice, and respect for people's rights

and dignity (American Psychological Association, 2017). Following the five general principles means that the goal of this research was to benefit the respondents and to minimize harm, to take full responsibility and not strive to personal advantage, being honest and truthful, avoid judgement bias and acknowledge my competences and limitations, as well as to respect cultural and individual differences and avoid bias based on those factors (American Psychological Association, 2017).

Additionally, this research also abided the Netherlands Code of Conduct for Research Integrity, consisting of honesty, scrupulousness, transparency, independence, and responsibility (KNAW, 2018). In addition to the above, this means that this research was encountered seriously and open, and results were not fabricated, the best possible methods and research design was used, results and processes will be visible for others, and if not possible due to for example privacy or confidentiality, this will be explained clearly (KNAW, 2018).

To ensure research ethics were not violated, multiple measures have been taken. The only requirement to participate in the survey was a minimum age of 18 years old. Participants were notified about this requirement beforehand and asked not to participate, and the data of any minors that still participated were excluded for our analysis. Also, no personal information such as names, addresses, contact details, et cetera were asked during the survey to sustain the anonymous character of the respondents. It is in no way possible to link back our respondent's data to an individual, and data will be used for this research only.



## 4. Results

In this chapter the results of the pre-tests and multiple regression analyses will be discussed.

### 4.1 Pre-tests

To test the difference between the two scenarios a one-way ANOVA test was conducted. Levene's test is significant ( $p < .01$ ) which means that the variances of the groups are not equal ( $H_0$  is rejected). However, because the sample size of the groups is equal ( $N = 31$ ) this should not be a problem. This is confirmed by Welch's F and Brown and Forsythe's F, which are equal to the original F statistic. The results showed that the means of the two contexts significantly differ from each other ( $F(1, 60) = 61.334, p < .01$ ) and the effect of the context on perceived risk is large ( $r = 0.71$ ). The *descriptives* table shows that the credence scenario has a higher perceived risk than the search scenario ( $M = 2.63, SD = 0.72$  vs.  $M = 1.48, SD = 0.40$ ). The SPSS output can be found in Appendix 8.

To test the difference between the typefaces a one-way ANOVA test was conducted as well. Levene's test is significant ( $p < .01$ ) which means that the variances of the groups are not equal ( $H_0$  is rejected). However, because the sample size of the groups is equal ( $N = 192$ ) this should not be a problem. This is confirmed by Welch's F and Brown and Forsythe's F, which are equal to the original F statistic. The results showed that the means between the typefaces significantly differ ( $F(1, 382) = 14.855, p < .01$ ), but the effect size shows that the effect of the chosen typefaces on perceived roundness is low ( $r = 0.192$ ). The independent samples t-test shows that Dongle is perceived as the roundest typeface ( $M = 4.38, SD = 1.24$ ), whereas Smooch Sans is perceived as the least round typeface, making it the most angular typeface ( $M = 2.34, SD = 1.41$ ) in the sample. the SPSS output can be found in appendix 8.

### 4.2 Assumptions

To start, independence is ensured as much as possible, by assigning the different conditions randomly to the respondents. Secondly, Box's M test was conducted. Box's M test was non-significant ( $p > .01$ ), indicating there are no differences between groups (appendix 9a). Third, all variables show a normal distribution, except utilitarian experience (appendix 9b). However, the sample size ( $N = 324$ ) is large enough to not make this a problem for the analysis so this will be ignored (Hair et al., 2019). Lastly, all variables show a linear relationship, only mood

shows no correlation at all (appendix 9c). Since transforming the data does not change this, the mood variable will be left out of the analysis because it will not contribute to the results.

For the regression analysis, an additional test for multicollinearity is conducted (appendix 9c). This test shows that there are no signs of problematic multicollinearity ( $VIF < 2$ ,  $Tolerance > .8$ ). The other regression assumptions have also been met through various tests that have already been conducted for the MANOVA assumptions.

### 4.3 Analysis

#### 4.3.1 Typeface curvature → customer satisfaction and customer loyalty

The MANCOVA for the direct effect has led to the following results (appendix 10a, and table 3): typeface curvature has no significant effect on customer satisfaction and customer loyalty when the effect was controlled for typeface preference, gender, age, prior experience, language, education and attitude ( $F(2, 314) = 0.42, p > .05, \omega = 1.00$ ), as well as when it was moderated by perceived risk ( $F(2, 313) = 0.33, p > .05, \omega = 1.00$ ). However, perceived risk has a significant positive effect on customer satisfaction ( $F(1, 314) = 23.69, p < .01$ ) and customer loyalty ( $F(1, 314) = 33.17, p < .01$ ) (appendix 10a and table 4). Also, there are some significant effects found of control variables on the dependent variables (appendix 10a and table 4): typeface preference has a significant positive effect on customer satisfaction ( $F(1, 314) = 4.44, p < .05$ ) and customer loyalty ( $F(1, 314) = 4.05, p < .05$ ), prior experience has a significant positive effect on customer loyalty ( $F(1, 314) = 6.99, p < .05$ ), and attitude has a significant positive effect on customer satisfaction ( $F(1, 314) = 36.36, p < .01$ ) and customer loyalty ( $F(1, 314) = 89.91, p < .01$ ). Because there is no significant effect of typeface curvature on customer satisfaction and customer loyalty, H1 and H3a are rejected.

Relation	F	df1	df2	p	$\omega$
Without moderation	0.422	2	314	.656	.997
With moderation	0.334	2	313	.717	.998

Table 3: multivariate test

Relation	F	df1	df2	p
Perceived risk → customer satisfaction	23.686	1	314	.000
Perceived risk → customer loyalty	33.165	1	314	.000
Typeface preference → customer satisfaction	4.444	1	314	.036
Typeface preference → customer loyalty	4.045	1	314	.045

Prior experience → customer loyalty	6.985	1	314	.009
Attitude → customer satisfaction	36.359	1	314	.000
Attitude → customer loyalty	89.914	1	314	.000

Table 4: tests of between-subjects effects

#### 4.3.2 Typeface curvature → hedonic experience and utilitarian experience

The MANCOVA for the effect of typeface curvature on hedonic and utilitarian experience led to the following results (appendix 10b and table 5): typeface curvature has no significant effect on hedonic experience and utilitarian experience when the effect was controlled for typeface preference, gender, age, prior experience, language, education and attitude ( $F(2, 314) = 0.10$ ,  $p > .05$ ,  $\omega = 1.00$ ), as well as when it was moderated by perceived risk ( $F(2, 313) = 0.07$ ,  $p > .05$ ,  $\omega = 1.00$ ). However, perceived risk has a significant positive effect on utilitarian experience ( $F(1, 314) = 8.36$ ,  $p < .01$ ) (appendix 10b and table 6). Also, there are some significant effects found of control variables on the dependent variables (appendix 10b and table 6): age has a significant positive effect on utilitarian experience ( $F(1, 314) = 4.93$ ,  $p < .05$ ), and attitude has a significant positive effect on hedonic experience ( $F(1, 314) = 34.05$ ,  $p < .01$ ) and utilitarian experience ( $F(1, 314) = 12.98$ ,  $p < .01$ ). Because typeface curvature has no significant effect on hedonic and utilitarian experience, hypotheses 2a and 2b are rejected. the moderation effect of perceived risk on the relation between typeface curvature and hedonic and utilitarian experience is not significant, H3b, H3e and h3f are rejected.

Relation	F	df1	df2	p	$\omega$
Without moderation	0.103	2	314	.902	.999
With moderation	0.073	2	313	.929	1.000

Table 5: multivariate test

Effect	F	df1	df2	p
Perceived risk → utilitarian experience	8.358	1	314	.004
Age → utilitarian experience	4.929	1	314	.027
Attitude → hedonic experience	34.046	1	314	.000
Attitude → utilitarian experience	12.984	1	314	.000

Table 6: tests of between-subjects effects

#### 4.3.3 Hedonic and utilitarian experience → customer satisfaction and customer loyalty

The multiple regression analyses for the effect of hedonic experience on customer satisfaction has led to the following results (appendix 10c, and table 7): the model predicts 33.48% of the

variance ( $R^2 = .33$ ,  $F(10, 313) = 15.75$ ,  $p < .01$ ). There is no significant effect of hedonic experience on customer satisfaction ( $\beta = .27$ ,  $p > .05$ ), but there is a significant negative effect of perceived risk on customer satisfaction ( $\beta = -.68$ ,  $p < .01$ ). There is no significant moderating effect of perceived risk on the relation between hedonic experience and customer satisfaction ( $\beta = .04$ ,  $p = .46$ ). The observed statistical power is 1.0 (Soper, 2022). See appendix 10c and table 8 for an overview.

<b>R<sup>2</sup></b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>
.5786	15.7533	10	313	.0000

Table 7: multiple regression analysis model summary

<b>Effect</b>	<b><math>\beta</math></b>	<b>p</b>
Hedonic experience → customer satisfaction	.2702	.1121
Perceived risk → customer satisfaction	-.6845	.0043
Interaction	.0416	.4622

Table 8: multiple regression analysis model

The multiple regression analyses for the effect of hedonic experience on customer loyalty has led to the following results (appendix 10c, and table 9): the model predicts 49.30% of the variance ( $R^2 = .70$ ,  $F(10, 313) = 30.43$ ,  $p < .01$ ). There is a significant positive effect of hedonic experience on customer loyalty ( $\beta = .41$ ,  $p < .01$ ), which means hypothesis H2c is accepted. Also, there is a significant negative effect of perceived risk on customer loyalty ( $\beta = -.60$ ,  $p < .01$ ). There is no significant moderating effect of perceived risk on the relation between hedonic experience and customer loyalty ( $\beta = .01$ ,  $p = .89$ ). The observed statistical power is 1.0 (Soper, 2022). See appendix 10c and table 10 for an overview.

<b>R<sup>2</sup></b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>
.4930	30.4306	10	313	.0000

Table 9: multiple regression analysis model summary

<b>Effect</b>	<b><math>\beta</math></b>	<b>p</b>
Hedonic experience → customer loyalty	.4111	.0067
Perceived risk → customer loyalty	-.6038	.0046
Interaction	.0072	.8853

Table 10: multiple regression analysis model

The multiple regression analyses for the effect of utilitarian experience on customer satisfaction has led to the following results (appendix 10c, and table 11): the model predicts 37.80% of the variance ( $R^2 = .38$ ,  $F(10, 313) = 19.02$ ,  $p < .01$ ), and there is no significant effect of utilitarian

experience on customer satisfaction ( $\beta = -.24, p > .05$ ), which means hypothesis H2d is rejected. Also, there is no significant effect of perceived risk on customer satisfaction ( $\beta = -.24, p > .05$ ). There is no significant moderating effect of perceived risk on the relation between hedonic experience and customer satisfaction ( $\beta = .05, p = .41$ ). The observed statistical power is 1.0 (Soper, 2022). See appendix 10c and table 12 for an overview.

<b>R<sup>2</sup></b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>
.3780	19.0193	10	313	.0000

Table 11: multiple regression analysis model summary

<b>Effect</b>	<b><math>\beta</math></b>	<b>p</b>
utilitarian experience → customer satisfaction	-.2434	.2023
Perceived risk → customer satisfaction	-.2405	.1593
Interaction	-.0517	.4060

Table 12: multiple regression analysis model

The multiple regression analyses for the effect of utilitarian experience on customer loyalty has led to the following results (appendix 10c, and table 13): the model predicts 36.37% of the variance ( $R^2 = .36, F(10, 313) = 17.89, p < .01$ ). There is no significant effect of utilitarian experience on customer loyalty ( $\beta = -.07, p > .05$ ), but there is a significant negative effect of perceived risk on customer loyalty ( $\beta = -.42, p < .05$ ). There is no significant moderating effect of perceived risk on the relation between utilitarian experience and customer loyalty ( $\beta = .03, p = .62$ ). The observed statistical power is 1.0 (Soper, 2022). See appendix 10c and table 14 for an overview. Because there is no significant moderating effect of perceived risk on any of the relations in this paragraph, hypothesis H3c is rejected.

<b>R<sup>2</sup></b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>
.3637	17.8872	10	313	.0000

Table 13: multiple regression analysis model summary

<b>Effect</b>	<b><math>\beta</math></b>	<b>p</b>
utilitarian experience → customer loyalty	-.0716	.7150
Perceived risk → customer loyalty	-.4188	.0175
Interaction	-.0315	.6233

Table 14: multiple regression analysis model

#### 4.3.4 Typeface curvature → hedonic and utilitarian experience → customer satisfaction and customer loyalty

The (moderated) mediation regression analysis led to the following results (appendix 10d, and table 15): there is no significant mediation effect of hedonic experience on the relation between typeface curvature and customer satisfaction ( $effect = .01$ ,  $SE = .05$ ,  $95\% CI = -.09; .10$ ), and of utilitarian experience on the relation between typeface curvature and customer satisfaction ( $effect = -.02$ ,  $SE = .07$ ,  $95\% CI = -.16; .12$ ). Also, there is no significant mediation effect of hedonic experience on the relation between typeface curvature and customer loyalty ( $effect = .02$ ,  $SE = .06$ ,  $95\% CI = -.12; .14$ ) and of utilitarian experience on the relation between typeface curvature and customer loyalty ( $effect = -.01$ ,  $SE = .03$ ,  $95\% CI = -.06; .04$ ). Because both hedonic and utilitarian experience have no significant mediating effect on the relation between typeface curvature and customer satisfaction and customer loyalty, H2 is rejected.

Relation	Effect	SE	LLCI	ULCI
Typeface curvature → hedonic experience → customer satisfaction	.0113	.0479	-.0906	.1012
Typeface curvature → utilitarian experience → customer satisfaction	-.0232	.0693	-.1563	.1161
Typeface curvature → hedonic experience → customer loyalty	.0150	.0640	-.1153	.1399
Typeface curvature → utilitarian experience → customer loyalty	-.0083	.0262	-.0646	.0440

Table 15: indirect effects of mediation

Additionally, there is no significant moderated mediation effect of hedonic experience on the relation between typeface curvature and customer satisfaction, moderated by perceived risk with an index of 0.79 ( $95\% CI = -.04; .22$ ) and of utilitarian experience on the relation between typeface curvature and customer satisfaction, moderated by perceived risk with an index of 0.08 ( $95\% CI = -.08; .26$ ). There is also no significant moderated mediation effect of hedonic experience on the relation between typeface curvature and customer loyalty, moderated by perceived risk with an index of 0.10 ( $95\% CI = -.07; .29$ ) and of utilitarian experience on the relation between typeface curvature and customer loyalty, moderated by perceived risk with an index of 0.03 ( $95\% CI = -.02; .11$ ). These outcomes can be found in appendix 10d and table 16. Because there is no significant moderated mediation effect, hypothesis H3d is rejected.

Relation	Index	LLCI	ULCI
----------	-------	------	------

Typeface curvature → hedonic experience → customer satisfaction + moderation	0.0786	-.0440	.2180
Typeface curvature → utilitarian experience → customer satisfaction + moderation	0.0823	-.0755	.2599
Typeface curvature → hedonic experience → customer loyalty + moderation	0.1041	-.0676	.2875
Typeface curvature → utilitarian experience → customer loyalty + moderation	0.0293	-.0240	.1072

Table 16: indirect effects moderated mediation

## 5. Conclusion & Discussion

### 5.1 Conclusion

The key finding from this research is that there is no significant direct effect found of typeface curvature on customer satisfaction and customer loyalty, typeface curvature on hedonic and utilitarian experience, and no indirect effect of typeface curvature on customer satisfaction and customer loyalty mediated by hedonic and utilitarian experience. Also, perceived risk has no moderating effect on these relationships. With these findings, the research question “*What is the effect of typeface curvature used in a chatbot conversation on customer experience, and how is this effect influenced by perceived risk?*” can be answered with; there is no significant effect found of typeface curvature used in a chatbot conversation on CX.

### 5.2 Theoretical implications

Although there is no significant effect found of typeface curvature on customer experience, there is a significant, positive effect found of hedonic experience on customer loyalty. This contributes to the findings of Chitturi et al. (2008), who already stated that exceeding customer’s hedonic needs will lead to customer loyalty. This research might imply that exceeding a customer’s hedonic need is not necessary but offering a positive hedonic experience at least could be enough. It must be said that in this research it was not tested what the expectations of the respondents were before the experiment, so if these findings differ or mean the same as those of Chitturi et al. (2008), cannot be claimed. Nevertheless, the findings of this research contribute to those of Chitturi et al. (2008) because the experiment took place in a chatbot context. This finding also follows up on the call from e.g., Jaakkola et al. (2015) and Rose et al. (2011) to address CX in an online context through customer satisfaction and customer loyalty.

This research has attempted to fill a knowledge gap regarding the influence of typeface on CX in a chatbot context. As far as this research goes, there is no significant influence found. However, first steps have been taken to address this gap and this research. The significant effects of some of the control variables and the moderator imply that there are some relevant factors influencing CX, contributing to the existing research.



### 5.3 Practical implications

Regarding the non-significant results of this experiment, there are two ways to look at the implications for designers and developers. One way, one might conclude that there is no significant effect of typeface curvature on CX, so designers and developers should not worry about it. On the other hand, that no significant effect has been found in this research, does not necessarily mean that there is no effect. This said, it might be wise to not give any suggestion at all on this topic. What might be interesting for designers and developers, is the significant effect of typeface preference on the relationship between typeface curvature and customer loyalty and customer satisfaction. The link between design features and preference is already known; for example, Krishna et al. (2017) have found that design features can influence the preference for a certain product. However, the results of this study might imply that although typeface curvature objectively has no significant effect on customer loyalty and customer satisfaction, people might be sensitive to typeface if it matches their preference or not. So, more research will be needed to investigate if the effect found by for example Krishna et al. (2017), also works the opposite way.

Furthermore, for managers this research might be interesting, as it shows that focusing on providing a positive hedonic experience leads to more customer loyalty, which is essential for competitive advantage (e.g., Lemon & Verhoef, 2016; McColl-Kennedy et al., 2015) and is of influence on an organisation's profit (Bodet, 2008). In general, as Brandtzaeg & Følstad (2018) already stated, it stays important to monitor customer's desires and needs in chatbot interactions.

### 5.4 Limitations

This study contained some limitations that might have influenced the (non-)significance of some results. To start, the two typefaces that were chosen did not only differ in curvature, but also in, for example, height, width, and boldness. It cannot be verified that the non-significance is due to the curvature, instead of other factors. Also, there was no manipulation check included in the main experiment, so it cannot be claimed that the 'round' typeface was perceived as round by the respondents, as well as if the 'angular' typeface was indeed perceived as angular. Although a pre-test was conducted, this manipulation check should have been part of the main experiment.

Regarding the perceived risk moderation, a cause of the non-significance might be that there was not a large difference between the search and credence contexts. In other words, there was no extreme low risk and extreme high risk scenario. Additionally, opposed to the pre-test, both scenarios were rated as 'above average' risky by the respondents. The results thus mean that the level of risk might be of influence, but it is not the difference between a high risk and low risk situation. This could possibly have been overcome by testing more scenarios in the pre-test, instead of only two. Another reason the respondents rated both scenarios above average risky, might have to do with the fact that they took place in a chatbot context, and people might have found this rather risky in general.

Another reason for the absence of significant results might be the time respondents took to complete the experiment. The average duration was over an hour for an experiment that should have taken between five and ten minutes. It is not possible to find out exactly why people took that long, but an option is that they had their focus on multiple activities while they should have focused on the experiment and survey only. For example, if someone watched the video, went shopping, and then filled out the survey, it can be that they did not remember the typeface or the level of risk they perceived as good as if they filled in the survey immediately after watching the video. Also, the fact that almost 100 respondents did not finish the survey might imply that it was too long, resulting in reduction of attention from the respondents that did finish it. This could be caused by the collaboration between different researchers, which led to a longer survey than needed for this particular research. Although the collaboration resulted in a probably higher number of respondents, the increased length could be a downside of it.

The control variable mood turned out to have no relationship with the other variables, which can be caused by the reduction of the scale to only one question, while mood is a much more complex concept. Perhaps this one question was not enough to establish a relationship with the other variables.

When discussing the control variables, there are probably many more factors that could have influenced the effect of typeface curvature and the other relationships. Due to time concerns the, in the eyes of the researcher, most important ones were selected, but those are probably not all factors that have an influence on the tested relationships.

Lastly, the systematic literature review was conducted early in the process, when all the independent researchers were working on different conceptual models than the final one. Although there was general overlap, part of the focus of the review went to topics that turned out to be (partly) irrelevant in the end. On the other hand, it also led to articles that might not have turned up through snowballing on the eventual topic, which is a slight advantage as well and facilitated out-of-the-box thinking.

## 5.5 Further research avenues

The fact that this study did not lead to ground-breaking significant results, does not mean the doors to future research are shut. Following up on the limitations, there are numerably flaws in this particular research design, which do not necessarily mean that these topics are not worth researching. In a situation where more time is available, so more effort can be put into the preparation and execution of the research, a reviewed design of this research might lead to significant results. After all, the theoretical basis to assume certain relationships is present.

Furthermore, some of the control variables and the moderator turned out to have a significant effect on different dependent variable. This was the case for perceived risk, typeface preference, and attitude towards technology on customer satisfaction and customer loyalty, and for prior experience on customer loyalty only, while testing the relationship between typeface curvature and customer satisfaction and customer loyalty. This was also the case for perceived risk, age, and attitude on utilitarian experience, and attitude towards technology on the relationship between typeface curvature and hedonic experience, while testing the relationship between typeface curvature and utilitarian experience. Moreover, a significant negative effect was found of perceived risk on customer loyalty, while testing the relationship between hedonic and utilitarian experience and customer loyalty, and of perceived risk on customer satisfaction while testing the relationship between hedonic experience and customer satisfaction. All these significant effects create opportunities for further research on the concepts individually since more knowledge about them can be of use for managers, and contributes to the theory on CX, customer loyalty and customer satisfaction.

## References

- Abu-Shanab, E. A. (2011). Education level as a technology adoption moderator. *ICCRD2011 - 2011 3rd International Conference on Computer Research and Development, 1*, 324–328. <https://doi.org/10.1109/ICCRD.2011.5764029>
- American Psychological Association. (2017). *Ethical Principles of Psychologists and Code of Conduct*. <https://www.apa.org/ethics/code>
- Araujo, T. (2018). Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions. *Computers in Human Behavior, 85*, 183–189. <https://doi.org/10.1016/j.chb.2018.03.051>
- Ashfaq, M., Yun, J., Yu, S., & Loureiro, S. M. C. (2020). I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents. *Telematics and Informatics, 54*. <https://doi.org/10.1016/j.tele.2020.101473>
- Babin, B. J., Darden, W. R., & Griffin, M. (1994a). Work and/or fun: Measuring hedonic and utilitarian shopping value. *Journal of Consumer Research, 20*(4), 644–656.
- Babin, B. J., Darden, W. R., & Griffin, M. (1994b). Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value. *Journal of Consumer Research, 20*(4), 644–656.
- Bar, M., & Neta, M. (2006). *Humans Prefer Curved Visual Objects*. <http://barlab.mgh.harvard.edu/BarNeta>
- Batra, R., & Ahtola, O. T. (1990). Measuring the Hedonic and Utilitarian Sources of Consumer Attitudes. In *Marketing Letters* (Vol. 2, Issue 2).
- Becker, L., & Jaakkola, E. (2020). Customer experience: fundamental premises and implications for research. In *Journal of the Academy of Marketing Science* (Vol. 48, Issue 4, pp. 630–648). Springer. <https://doi.org/10.1007/s11747-019-00718-x>
- Bernerth, J. B., & Aguinis, H. (2016). A critical review and best-practice recommendations for control variable usage. *PERSONNEL PSYCHOLOGY, 69*, 229–283. <https://doi.org/10.1111/peps.12103>
- Bhatia, J., & Breaux, T. D. (2018). Empirical measurement of perceived privacy risk. *ACM Transactions on Computer-Human Interaction, 25*(6). <https://doi.org/10.1145/3267808>
- Bhattacharjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly, 25*(3), 351–370.

- Blazevic, V., & Sidaoui, K. (2022). The TRISEC framework for optimizing conversational agent design across search, experience and credence service contexts. *Journal of Service Management*. <https://doi.org/10.1108/JOSM-10-2021-0402>
- Blut, M., Wang, C., & Schoefer, K. (2016). Factors Influencing the Acceptance of Self-Service Technologies: A Meta-Analysis. *Journal of Service Research*, 19(4), 396–416. <https://doi.org/10.1177/1094670516662352>
- Bodet, G. (2008). Customer satisfaction and loyalty in service: Two concepts, four constructs, several relationships. *Journal of Retailing and Consumer Services*, 15(3), 156–162. <https://doi.org/10.1016/J.JRETCONSER.2007.11.004>
- Botnation.AI. (n.d.). *Botnation.AI*. Retrieved July 8, 2022, from <https://botnation.ai/en/>
- Brandtzaeg, P. B., & Følstad, A. (2018). Chatbots: changing user needs and motivations. *Interactions*, 25(5), 38–43. <https://doi.org/10.1145/3236669>
- Brumberger, E. R. (2003). The Rhetoric of Typography: The Persona of Typeface and Text. *Technical Communication*, 50, 206–223.
- Candello, H., Pinhanez, C., & Figueiredo, F. (2017). Typefaces and the perception of humanness in natural language chatbots. *Conference on Human Factors in Computing Systems - Proceedings, 2017-May*, 3476–3487. <https://doi.org/10.1145/3025453.3025919>
- Chang, J. W., Lee, M. C., & Wang, T. I. (2016). Integrating a semantic-based retrieval agent into case-based reasoning systems: A case study of an online bookstore. *Computers in Industry*, 78, 29–42. <https://doi.org/10.1016/j.compind.2015.10.007>
- Chen, N., Jiao, J. (Jenny), Fan, X., & Li, S. (Kevin). (2021). The shape of loneliness: The relationship between loneliness and consumer preference for angular versus circular shapes. *Journal of Business Research*, 136, 612–629. <https://doi.org/10.1016/j.jbusres.2021.07.046>
- Chitturi, R., Raghunathan, R., Mahajan, V., Harbin, J. P., & Chair, C. (2008). Delight by Design: The Role of Hedonic Versus Utilitarian Benefits. *Journal of Marketing*, 72, 48–63.
- Choi, S., & Aizawa, K. (2019). Emotype: Expressing emotions by changing typeface in mobile messenger texting. *Multimedia Tools and Applications*, 78(11), 14155–14172. <https://doi.org/10.1007/s11042-018-6753-3>
- Choi, S., Mattila, A. S., & Bolton, L. E. (2021). To Err Is Human(-oid): How Do Consumers React to Robot Service Failure and Recovery? *Journal of Service Research*, 24(3), 354–371. <https://doi.org/10.1177/1094670520978798>

- CNBC. (2017, May 9). *Chatbots expected to cut business costs by \$8 billion by 2022*.  
<https://www.cnbc.com/2017/05/09/chatbots-expected-to-cut-business-costs-by-8-billion-by-2022.html>
- Council of Europe. (n.d.). *Common European Framework of Reference for Languages*.  
 Retrieved May 23, 2022, from <https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions>
- Crolic, C., Thomaz, F., Hadi, R., & Stephen, A. T. (2022). Blame the Bot: Anthropomorphism and Anger in Customer–Chatbot Interactions. *Journal of Marketing*, 86(1), 132–148. <https://doi.org/10.1177/00222429211045687>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319–339.
- de Cicco, R., e Silva, S. C., & Alparone, F. R. (2020). Millennials’ attitude toward chatbots: an experimental study in a social relationship perspective. *International Journal of Retail and Distribution Management*, 48(11), 1213–1233.  
<https://doi.org/10.1108/IJRDM-12-2019-0406>
- de Keyser, A., Verleye, K., Lemon, K. N., Keiningham, T. L., & Klaus, P. (2020). Moving the Customer Experience Field Forward: Introducing the Touchpoints, Context, Qualities (TCQ) Nomenclature. *Journal of Service Research*, 23(4), 433–455.  
<https://doi.org/10.1177/1094670520928390>
- de Sousa, M. M. M., Carvalho, F. M., & Pereira, R. G. F. A. (2020). Do typefaces of packaging labels influence consumers’ perception of specialty coffee? A preliminary study. *Journal of Sensory Studies*, 35(5). <https://doi.org/10.1111/joss.12599>
- Dickson, R., Cherry, M. G., & Boland, A. (2017). *Doing a Systematic Review A Student’s Guide* (2nd ed.). SAGE Publications Ltd.
- Dowling, G. R., & Staelin, R. (1994). A Model of Perceived Risk and Intended Risk-Handling Activity. In *Source: Journal of Consumer Research* (Vol. 21, Issue 1). Elsevier. (n.d.). *Scopus*. Retrieved August 4, 2022, from  
<https://www.scopus.com/search/form.uri?display=basic&zone=header&origin=searchbasic#basic>
- Enago. (2021, September 30). *ISI, Scopus or PubMed: How Do I Choose the Best Journal Based on its Indexing?* <https://www.enago.com/academy/isi-scopus-or-pubmed/>.
- Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.). SAGE Publications Ltd.

- Følstad, A., Araujo, T., Law, E. L. C., Brandtzaeg, P. B., Papadopoulos, S., Reis, L., Baez, M., Laban, G., McAllister, P., Ischen, C., Wald, R., Catania, F., Meyer von Wolff, R., Hobert, S., & Luger, E. (2021). Future directions for chatbot research: an interdisciplinary research agenda. *Computing*, 103(12), 2915–2942.  
<https://doi.org/10.1007/s00607-021-01016-7>
- Fox, E. (2018). Perspectives from affective science on understanding the nature of emotion. *Brain and Neuroscience Advances*, 2, 239821281881262.  
<https://doi.org/10.1177/2398212818812628>
- Girard, T., & Dion, P. (2010). Validating the search, experience, and credence product classification framework. *Journal of Business Research*, 63(9–10), 1079–1087.  
<https://doi.org/10.1016/j.jbusres.2008.12.011>
- González-Carrasco, I., Jiménez-Márquez, J. L., López-Cuadrado, J. L., & Ruiz-Mezcua, B. (2019). Automatic detection of relationships between banking operations using machine learning. *Information Sciences*, 485, 319–346. <https://doi.org/10.1016/j.ins.2019.02.030>
- Google. (n.d.). *Google Fonts*. Retrieved August 14, 2022, from <https://fonts.google.com/>
- Grewal, D., Levy, M., & Kumar, V. (2009). Customer Experience Management in Retailing: An Organizing Framework. *Journal of Retailing*, 85(1), 1–14.  
<https://doi.org/10.1016/j.jretai.2009.01.001>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed., Vol. 3). Cengage Learning, EMEA.
- Hair, N., Rose, S., & Clark, M. (2009). Using qualitative repertory grid techniques to explore perceptions of business-to-business online customer experience. *Journal of Customer Behaviour*, 8(1), 51–65. <https://doi.org/10.1362/147539209x414380>
- Havlena, W. J., & Holbrook, M. B. (1986). The Varieties of Consumption Experience: Comparing Two Typologies of Emotion in Consumer Behavior. *Source: Journal of Consumer Research*, 13(3), 394–404. <https://www.jstor.org/stable/2489430>
- Hayes, A. F. (2017). *An analytical primer and computational tool for observed variable moderation, mediation, and conditional process modeling*. Guilford publications.
- Hazlett, R. L., Larson, K., Shaikh, A. D., & Chaparo, B. S. (2013). Two studies on how a typeface congruent with content can enhance onscreen communication. *Information Design Journal*, 20(3), 207–219. <https://doi.org/10.1075/idj.20.3.02haz>
- Hevneb, K. (1935). EXPERIMENTAL STUDIES OF THE AFFECTIVE VALUE OF COLORS AND LINES. *Journal of Applied Psychology*, 19, 385–398.

- Holbrook, M. B. (1978). Beyond Attitude Structure: Toward the Informational Determinants of Attitude. *Journal of Marketing Research*, 15, 545–556.
- Holbrook, M. B., & Hirschman, E. C. (1982). The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun. *Journal of Consumer Research*, 9(2), 132–140.
- Holbrook, M. B., & O’shaughnessy, J. (1984). The Role of Emotion in Advertising. *Psychology & Marketing*, 1, 45–64.
- Holst-Larkin, J. (2006). Visual literacy in higher education. *Business Communication Quarterly*, 69(4), 417–421. <http://www.educause.edu/ir/library/pdf/ELI4001.pdf>
- Ischen, C., Aruajo, T., Voorveld, H., van Noort, G., & Smit, E. (2020). Privacy Concerns in Chatbot Interactions. *CONVERSATIONS 2019, 11970 LNCS*, 34–48. [https://doi.org/10.1007/978-3-030-39540-7\\_5](https://doi.org/10.1007/978-3-030-39540-7_5)
- Ismail, A. R., Melewar, T., Lim, L., & Woodside, A. (2011). Customer experiences with brands: Literature review and research directions. *The Marketing Review*, 11(3), 205–225. <https://doi.org/10.1362/146934711x589435>
- Jaakkola, E., Helkkula, A., & Aarikka-Stenroos, L. (2015). Service experience co-creation: Conceptualization, implications, and future research directions. *Journal of Service Management*, 26(2), 182–205. <https://doi.org/10.1108/JOSM-12-2014-0323>
- Jacoby, J., & Kaplan, L. B. (1972). The Components Of Perceived Risk. In M. Venkatesan (Ed.), *SV - Proceedings of the Third Annual Conference of the Association for Consumer Research* (pp. 382–393). Association for Consumer Research. <https://www.researchgate.net/publication/247814928>
- Jain, R., Aagja, J., & Bagdare, S. (2017). Customer experience – a review and research agenda. In *Journal of Service Theory and Practice* (Vol. 27, Issue 3, pp. 642–662). Emerald Group Publishing Ltd. <https://doi.org/10.1108/JSTP-03-2015-0064>
- Jiang, Y., Gorn, G. J., Galli, M., & Chattopadhyay, A. (2016). Does your company have the right logo? How and why circular- and angular-logo shapes influence brand attribute judgments. *Journal of Consumer Research*, 42(5), 709–726. <https://doi.org/10.1093/jcr/ucv049>
- Joško Brakus, J., Schmitt, B. H., Zarantonello, L., & Simon, W. E. (2009). Brand Experience: What Is It? How Is It Measured? Does It Affect Loyalty? *Journal of Marketing*, 73, 1547–7185.
- Kastl, A. J., & Child, I. L. (1968). EMOTIONAL MEANING OF FOUR TYPOGRAPHICAL VARIABLES. *Journal Of Applied Psychology*, 52(6), 44–46.



- Klaus, P., & Maklan, S. (2012). EXQ: A multiple-item scale for assessing service experience. *Journal of Service Management*, 23(1), 5–33.  
<https://doi.org/10.1108/09564231211208952>
- KNAW. (2018). *Netherlands Code of Conduct for Research Integrity*.  
<https://doi.org/10.17026/dans-2cj-nvwu>
- Kranzbühler, A. M., Kleijnen, M. H. P., Morgan, R. E., & Teerling, M. (2018). The Multilevel Nature of Customer Experience Research: An Integrative Review and Research Agenda. *International Journal of Management Reviews*, 20(2), 433–456.  
<https://doi.org/10.1111/ijmr.12140>
- Krishna, A., Cian, L., & Aydınoğlu, N. Z. (2017). Sensory Aspects of Package Design. *Journal of Retailing*, 93(1), 43–54. <https://doi.org/10.1016/j.jretai.2016.12.002>
- Kulahcioglu, T., & de Melo, G. (2021). Semantics-aware typographical choices via affective associations. *Language Resources and Evaluation*, 55(1), 105–126.  
<https://doi.org/10.1007/s10579-020-09499-0>
- Kushwaha, A. K., Kumar, P., & Kar, A. K. (2021). What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Big data analytics. *Industrial Marketing Management*, 98, 207–221.  
<https://doi.org/10.1016/j.indmarman.2021.08.011>
- Lai-Ming Tam, J. (2012). The moderating role of perceived risk in loyalty intentions: An investigation in a service context. *Marketing Intelligence and Planning*, 30(1), 33–52.  
<https://doi.org/10.1108/02634501211193903>
- Larivière, B., Bowen, D., Andreassen, T. W., Kunz, W., Sirianni, N. J., Voss, C., Wunderlich, N. v., & de Keyser, A. (2017). “Service Encounter 2.0”: An investigation into the roles of technology, employees and customers. *Journal of Business Research*, 79, 238–246. <https://doi.org/10.1016/j.jbusres.2017.03.008>
- Larson, C. L., Aronoff, J., & Steuer, E. L. (2012). Simple geometric shapes are implicitly associated with affective value. *Motivation and Emotion*, 36(3), 404–413.  
<https://doi.org/10.1007/s11031-011-9249-2>
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69–96.  
<https://doi.org/10.1509/jm.15.0420>
- Li, Y., & Suen, C. Y. (2010). *Typeface Personality Traits and Their Design Characteristics*. DAS '10, June 9-11, 2010, Boston, MA, USA.

- Lieven, T., Grohmann, B., Herrmann, A., Landwehr, J. R., & van Tilburg, M. (2015). The effect of brand design on brand gender perceptions and brand preference. *European Journal of Marketing*, 49, 146–169. <https://doi.org/10.1108/EJM-08-2012-0456>
- Lipkin, M. (2016). Customer experience formation in today's service landscape. In *Journal of Service Management* (Vol. 27, Issue 5, pp. 678–703). Emerald Group Publishing Ltd. <https://doi.org/10.1108/JOSM-06-2015-0180>
- Liu, S. Q., Bogicevic, V., & Mattila, A. S. (2018). Circular vs. angular servicescape: “Shaping” customer response to a fast service encounter pace. *Journal of Business Research*, 89, 47–56. <https://doi.org/10.1016/j.jbusres.2018.04.007>
- Mackiewicz, J., & Moeller, R. (2004). Why people perceive typefaces to have different personalities. *IEEE International Professional Communication Conference*, 304–313. <https://doi.org/10.1109/ipcc.2004.1375315>
- MacPhail, C., Khoza, N., Abler, L., & Ranganathan, M. (2016). Process guidelines for establishing Inter-coder Reliability in qualitative studies. *Qualitative Research*, 16(2), 198–212. <https://doi.org/10.1177/1468794115577012>
- Mahr, D., Stead, S., & Odekerken-Schröder, G. (2019). Making sense of customer service experiences: a text mining review. *Journal of Services Marketing*, 33(1), 88–103. <https://doi.org/10.1108/JSM-10-2018-0295>
- Mano, H., & Oliver, R. L. (1993). Assessing the Dimensionality and Structure of the Consumption Experience: Evaluation, Feeling, and Satisfaction. In *Source: Journal of Consumer Research* (Vol. 20, Issue 3). <https://www.jstor.org/stable/2489359?seq=1&cid=pdf->
- Mattila, A., & Wirtz, J. (2000). MAR WILEY RIGHT INTERACTIVE Base of text Top of text Top of CT Base of DF The Role of Preconsumption Affect in Postpurchase Evaluation of Services. In *Psychology & Marketing* (Vol. 17, Issue 7). John Wiley & Sons, Inc.
- McColl-Kennedy, J. R., Gustafsson, A., Jaakkola, E., Klaus, P., Radnor, Z. J., Perks, H., & Friman, M. (2015). Fresh perspectives on customer experience. *Journal of Services Marketing*, 29(6–7), 430–435. <https://doi.org/10.1108/JSM-01-2015-0054>
- Morris, M. G., & Venkatesh, V. (2000). AGE DIFFERENCES IN TECHNOLOGY ADOPTION DECISIONS: IMPLICATIONS FOR A CHANGING WORK FORCE. *PERSONNEL PSYCHOLOGY*, 53.

- Oghuma, A. P., Libaque-Saenz, C. F., Wong, S. F., & Chang, Y. (2016). An expectation-confirmation model of continuance intention to use mobile instant messaging. *Telematics and Informatics*, 33(1), 34–47. <https://doi.org/10.1016/j.tele.2015.05.006>
- Oracle. (n.d.). *What is a Chatbot?* Retrieved January 29, 2022, from <https://www.oracle.com/chatbots/what-is-a-chatbot/>
- Oracle. (2017). *Chatbot Infographic*. <https://www.oracle.com/a/ocom/docs/chatbot-infographic-3672253.pdf>
- Page, M. J., Mckenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., Mcdonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372(71), 1–9. <https://doi.org/10.1136/bmj.n71>
- Park, C. W., Jaworski, B. J., & MacInnis, D. J. (1986). Strategic Brand Concept–Image Management. *Journal of Marketing*, 50(4), 135–145.
- Park, S. S., Tung, C. T. D., & Lee, H. (2021). The adoption of AI service robots: A comparison between credence and experience service settings. *Psychology and Marketing*, 38(4), 691–703. <https://doi.org/10.1002/mar.21468>
- Peterson, R. A., & Sauber, M. (1983). Mood Short Form: MSF (1999). *Handbook of Marketing Scales: Multi-Item Measures for Marketing and Consumer Behavior Research*, Thousands Oaks, Sage, 251.
- Picot-Coupey, K., Krey, N., Huré, E., & Ackermann, C. L. (2021). Still work and/or fun? Corroboration of the hedonic and utilitarian shopping value scale. *Journal of Business Research*, 126, 578–590. <https://doi.org/10.1016/j.jbusres.2019.12.018>
- Pine, B. J., & Gilmore, J. H. (1998). Welcome to the Experience Economy. *Harvard Business Review*, 78(1), 97–105.
- Poffenberger, A. T., & Barrows, B. E. (1924). THE FEELING VALUE OF LINES. *Journal of Applied Psychology*, 8, 187–205.
- Poffenberger, A. T., & Franken, R. B. (1923). A STUDY OF THE APPROPRIATENESS OF TYPE FACES. *Journal of Applied Psychology*, 7(4), 312–329.
- Prentice, C., & Nguyen, M. (2020). Engaging and retaining customers with AI and employee service. *Journal of Retailing and Consumer Services*, 56. <https://doi.org/10.1016/j.jretconser.2020.102186>

- Qualtrics. (n.d.). *Qualtrics*. Retrieved July 31, 2022, from <https://www.qualtrics.com/nl/?rid=langMatch&prevsite=en&newsite=nl&geo=NL&geo-match=>
- Rolschau, K., Janice Wang, Q., & Otterbring, T. (2020). Seeing sweet and choosing sour: Compensatory effects of typeface on consumers' choice behavior. *Food Quality and Preference*, 85, 103964. <https://doi.org/10.1016/J.FOODQUAL.2020.103964>
- Rose, S., Hair, N., & Clark, M. (2011). Online Customer Experience: A Review of the Business-to-Consumer Online Purchase Context. *International Journal of Management Reviews*, 13(1), 24–39. <https://doi.org/10.1111/j.1468-2370.2010.00280.x>
- Roselius, T. (1971). Consumer Rankings of Risk Reduction Methods. *Source: Journal of Marketing*, 35(1), 56–61.
- Ryu, K., Han, H., & Jang, S. S. (2010). Relationships among hedonic and utilitarian values, satisfaction and behavioral intentions in the fast-casual restaurant industry. *International Journal of Contemporary Hospitality Management*, 22(3), 416–432. <https://doi.org/10.1108/09596111011035981>
- Salgado-Montejo, A., Velasco, C., Olier, J. S., Alvarado, J., & Spence, C. (2014). Love for logos: Evaluating the congruency between brand symbols and typefaces and their relation to emotional words. *Journal of Brand Management*, 21, 635–649. <https://doi.org/10.1057/bm.2014.29>
- Schmitt, B. (1999). Experiential Marketing. In *Journal of Marketing Management* (Vol. 15).
- Schroll, R., Schnurr, B., & Grewal, D. (2018). Humanizing Products with Handwritten Typefaces. *Journal of Consumer Research*. <https://doi.org/10.1093/jcr/ucy014>
- Shankar, V., Smith, A. K., & Rangaswamy, A. (2003). Customer satisfaction and loyalty in online and offline environments. *International Journal of Research in Marketing*, 20(2), 153–175. [https://doi.org/10.1016/S0167-8116\(03\)00016-8](https://doi.org/10.1016/S0167-8116(03)00016-8)
- Sidaoui, K., Jaakkola, M., & Burton, J. (2020). AI feel you: customer experience assessment via chatbot interviews. *Journal of Service Management*, 31(4), 745–766. <https://doi.org/10.1108/JOSM-11-2019-0341>
- Smutny, P., & Schreiberova, P. (2020). Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education*, 151, 103862. <https://doi.org/10.1016/J.COMPEDU.2020.103862>
- Soper, D. S. (2022). *Post-hoc Statistical Power Calculator for Multiple Regression [Software]*. <https://www.danielsoper.com/statcalc/calculator.aspx?id=9>

- Strahilevitz, M., & Myers, J. G. (1998). Donations to Charity as Purchase Incentives: How Well They Work May Depend on What You Are Trying to Sell. *Journal of Consumer Research*, 24, 434–446.
- Suci, A., Maryanti, S., Hardi, H., & Sudiar, N. (2021). Willingness to pay for traditional ready-to-eat food packaging: examining the interplay between shape, font and slogan. *Asia Pacific Journal of Marketing and Logistics*. <https://doi.org/10.1108/APJML-04-2021-0233>
- SurveyCircle. (n.d.). *SurveyCircle*. Retrieved July 10, 2022, from SurveyCircle
- SurveySwap. (n.d.). *SurveySwap*. Retrieved July 10, 2022, from <https://surveyswap.io/>
- Tannenbaum, P. H., Jacobson, H. K., & Norris, E. L. (1964). An experimental investigation of typeface connotations. *Journalism Quarterly*, 41, 65–73.
- Tantillo, J., di Lorenzo-Aiss, J., & Mathisen, R. E. (1995). Quantifying Perceived Differences in Type styles: An Exploratory Study. *Psychology & Marketing*, 12(5), 447–457.
- Tassiello, V., Viglia, G., & Mattila, A. S. (2018). How handwriting reduces negative online ratings. *Annals of Tourism Research*, 73, 171–179. <https://doi.org/10.1016/j.annals.2018.05.007>
- Trivedi, J. (2019). Examining the Customer Experience of Using Banking Chatbots and Its Impact on Brand Love: The Moderating Role of Perceived Risk. *Journal of Internet Commerce*, 18(1), 91–111. <https://doi.org/10.1080/15332861.2019.1567188>
- van der Heijden, H., & Sørensen, L. S. (2003). *Measuring Attitudes Towards Mobile Information Services: An Empirical Validation of the HED/UT Scale*.
- van Leeuwen, T. (2006). Towards a semiotics of typography. *Information Design Journal*, 14(2), 139–155.
- Velasco, C., Salgado-Montejo, A., Marmolejo-Ramos, F., & Spence, C. (2014). Predictive packaging design: Tasting shapes, typefaces, names, and sounds. *Food Quality and Preference*, 34, 88–95. <https://doi.org/10.1016/J.FOODQUAL.2013.12.005>
- Velasco, C., Woods, A. T., Hyndman, S., & Spence, C. (2015). The taste of typeface. *I-Perception*, 6(4), 1–10. <https://doi.org/10.1177/2041669515593040>
- Vennix, J. A. M. (2019). *Research Methodology* (1st ed.). Pearson.
- VentureBeat. (2017, April 19). *Facebook Messenger hits 100,000 bots*. <https://venturebeat.com/2017/04/18/facebook-messenger-hits-100000-bots/>
- VentureBeat. (2018, May 1). *Facebook Messenger passes 300,000 bots*. <https://venturebeat.com/2018/05/01/facebook-messenger-passes-300000-bots/>

- Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies. *Journal of Retailing*, 85(1), 31–41.  
<https://doi.org/10.1016/j.jretai.2008.11.001>
- Voss, K. E., Spangenberg, E. R., & Grohmann, B. (2003). Measuring the Hedonic and Utilitarian Dimensions of Consumer Attitude. In *Journal of Marketing Research: Vol. XL*.
- Wang, L., Yu, Y., & Li, O. (2020). The typeface curvature effect: The role of typeface curvature in increasing preference toward hedonic products. *Psychology and Marketing*, 37(8), 1118–1137. <https://doi.org/10.1002/mar.21287>
- Westerman, S. J., Gardner, P. H., Sutherland, E. J., White, T., Jordan, K., Watts, D., & Wells, S. (2012). Product design: Preference for rounded versus angular design elements. *Psychology and Marketing*, 29(8), 595–605. <https://doi.org/10.1002/mar.20546>
- Westerman, S. J., Sutherland, E. J., Gardner, P. H., Baig, N., Critchley, C., Hickey, C., Mehigan, S., Solway, A., & Zervos, Z. (2013). The design of consumer packaging: Effects of manipulations of shape, orientation, and alignment of graphical forms on consumers' assessments. *Food Quality and Preference*, 27(1), 8–17.  
<https://doi.org/10.1016/j.foodqual.2012.05.007>

## Appendices

### Appendix 1: Inclusion/exclusion criteria SLR

	Inclusion Criteria	Criteria type:	Exclusion Criteria	Criteria type:
1	Include articles that refer to branding, marketing, and advertising	Setting	Exclude articles that the abstract does not clearly mention the research problem, the objectives, the methodology, or the results	Abstract
2	Include articles that link typeface to any aspect of customer experience (like hedonic/utilitarian values, emotions, feelings, cognition, etc.)		Exclude the articles that focus on user experience (e.g., the objective is to develop or test a specific algorithm, or mobile app on a specific population) and the medical field.	Setting
3	The title mentions at least one of the search terms; some of the articles that were found do not mention any of the search terms and are therefore irrelevant	Title	Exclude articles that examine the response of a specific population (e.g., students, people with vision loss, etc) on a specific chatbot design (e.g. question design)	Setting
4	The abstract must explicitly mention the research problem, the objectives of the study, the methodology that was followed, and the results. That is to evaluate the quality of the paper	Abstract	Exclude articles that focus on embodied robots and voice-based assistants (such as Cortana, Siri, Alexa, etc.)	Settings

	and check if we can get important insights for our topic;			
5	Include articles that test typeface/font impact in any context (e.g., like packaging, logos, messenger texting)	Settings	Exclude articles that focus on irrelevant experiences (e.g., accommodation experience)	Condition or exposure of interest
6	Include articles that focus on typeface/font characteristics (e.g., font width, font height, font curvature)	Settings	Exclude articles that examine the brain activity and brain/human responses to irrelevant stimuli (e.g., specific words or letters)	Setting
7	Include articles that examine the brain activity and brain responses to visual elements (e.g., fonts, shapes, colors, background color)	Setting	Exclude articles that examine the emotional impact of words (message content) and not the text design	Study design
8	Include articles that focus only on English alphabet/characters		Exclude articles that focus on reading performance, learning, and education	Setting
9			Exclude articles with title and/or abstract that is not in English	
10			Exclude articles that examine Japanese/Chinese alphabet	
11			Exclude articles that the objective is to compare different populations/ population responses	



## Appendix 2: Intercoder reliability calculation

	Group 1	Group 2
Agreed to include	63	65
Agreed to exclude	219	209
Only first coder wants to include	10	8
Only second coder wants to include	15	29
% Of agreement	91.86%	88.10%
Cohan's Kappa	0.79	0.70

## Appendix 3: Scenario chat flows

### Appendix 3a: Credence context – opening a bank account

**Chatbot:** Hello, I am the virtual assistant of Banko. I am trained to answer your requests.

**Chatbot:** How can I assist you?

**Customer:** I want to open a bank account.

**Chatbot:** For opening a bank account, please provide your date of birth. The format of your answer should be as follows: DD-MM-YY.

**Customer:** 01-02-1997

**Chatbot:** According to your age, you are eligible for opening a bank account. Please provide your phone number. The format of your answer should be as follows: +00 6 012345678.

**Customer:** +31 6 23722845

**Chatbot:** A registration link has been sent to your phone number. Enter the 8 digits you have received.

**Customer:** 1920 2816

**Chatbot:** To proceed with your application, please upload a copy of your identification (passport or ID-card).

*Upload Identification button*

**Customer:** *Uploads copy of identification via button provided*

**Chatbot:** Now please upload a photo of your face to complete verification.

*Upload photo button*

**Customer:** *Uploads photo of face via button provided*

**Chatbot:** You are verified. Please download our mobile Banko application from the App Store / Google Play Store. Sign up in the application with the following activation code 1845 and digitally sign the documents that are presented to you. Once the registration is finished and

accepted, you will receive a confirmation message with your bank account details and more information on when you will receive your card.

Do you have any other questions for me?

**Customer:** No

**Chatbot:** I hope to have informed you sufficiently. For more information visit [www.banko.nl](http://www.banko.nl)

### Appendix 3b: Search context – making an appointment

**Chatbot:** Hello, I am the virtual assistant of Banko. I am trained to answer your requests.

**Chatbot:** How can I assist you?

**Customer:** I want to make an appointment.

**Chatbot:** For what purpose do you want to make an appointment?

**Customer:** Insurance

**Chatbot:** Ok. Where do you want to have the appointment?

**Customer:** Nijmegen

**Chatbot:** In the area of Nijmegen, the closest Banko branch is on Hertogstraat 16, 6511 SC Nijmegen.

**Chatbot:** Here are three available time slots for Banko Hertogstraat, please choose one:

1. May 30, 2022: 9:00-9:15
2. May 30, 2022: 11:15-11:30
3. May 31, 2022: 14:00-14:15
4. I want to see other options

**Customer:** *Chooses option 2*

**Chatbot:** Your appointment is confirmed. Below you will find the details of your appointment:

- Branch: Banko Hertogstraat (Hertogstraat 16, 6511 SC Nijmegen)
- Time: 11:15-11:30
- Representative: Mrs. Stella Griep

To receive a confirmation email, please provide your email address.

**Customer:** [karel.willems@gmail.com](mailto:karel.willems@gmail.com)

**Chatbot:** Thank you. A confirmation email is sent to your email address. Please show this email at your appointment as verification. Do you have any other questions for me?

**Customer:** No

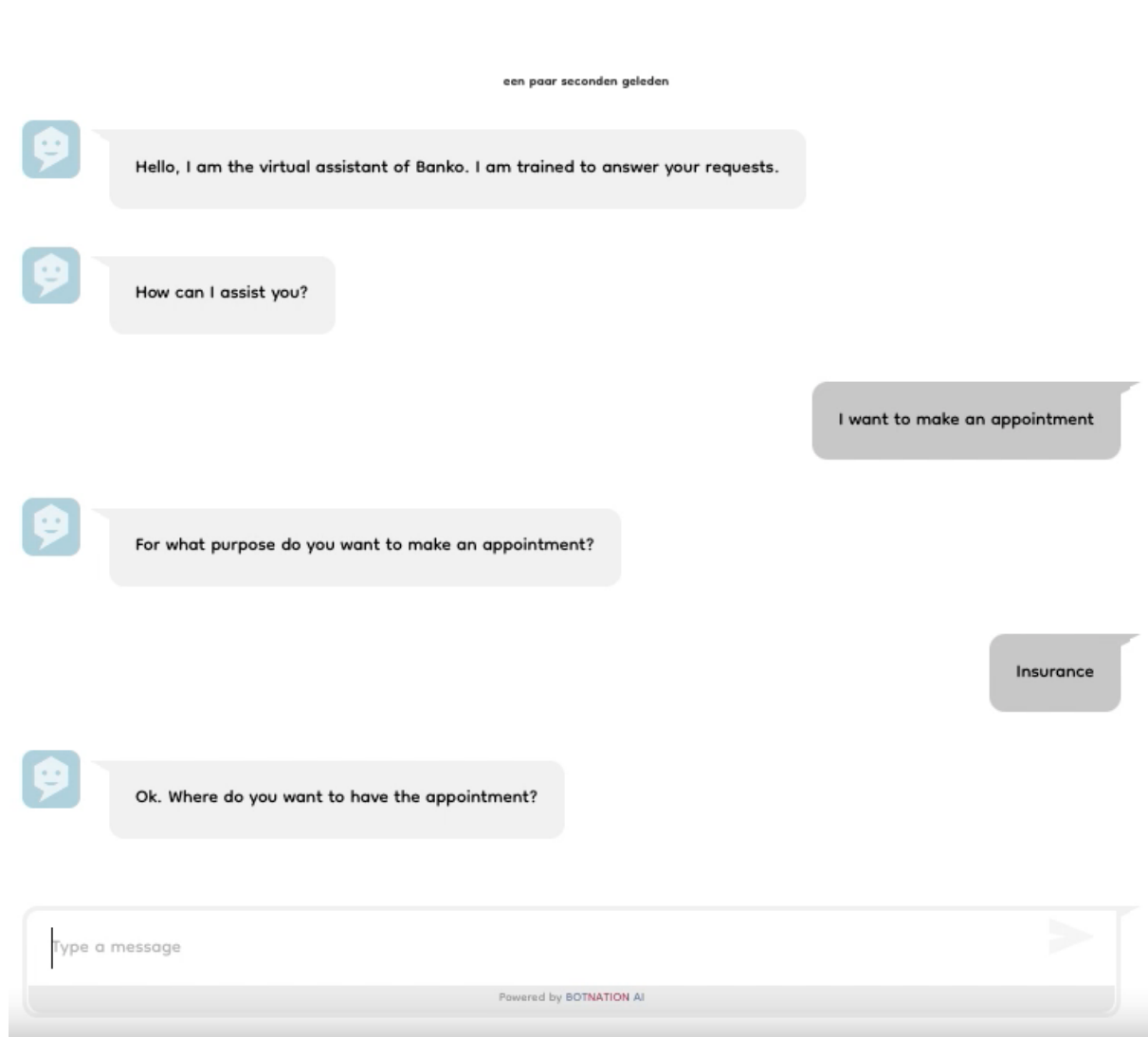
**Chatbot:** I hope to have informed you sufficiently. For more information visit [www.banko.nl](http://www.banko.nl)

#### Appendix 4: Typefaces pre-test

Typeface	Sample (Google, n.d.)
Dongle	<b>The quick brown fox jumps over the lazy dog.</b>
Dosis	The quick brown fox jumps over the lazy dog.
Gayathri	The quick brown fox jumps over the lazy dog.
Josefin sans	The quick brown fox jumps over the lazy dog.
Khand	The quick brown fox jumps over the lazy dog.
Nunito	The quick brown fox jumps over the lazy dog.
Open Sans	The quick brown fox jumps over the lazy dog.
Poppins	The quick brown fox jumps over the lazy dog.
Quicksand	The quick brown fox jumps over the lazy dog.
Roboto	The quick brown fox jumps over the lazy dog.
Smooch Sans	The quick brown fox jumps over the lazy dog.
Varela Round	The quick brown fox jumps over the lazy dog.

## Appendix 5: Screenshots chatbot conversations

### Search context – curved typeface





Ok. Where do you want to have the appointment?

Nijmegen



In the area of Nijmegen, the closest Banko branch is on Hertogstraat 16, 6511 SC Nijmegen.



Here are three available time slots for Banko Hertogstraat, please choose one:

- ☐ 1. May 30, 2022: 9:00-9:15
- ☒ 2. May 30, 2022: 11:15-11:30
- ☐ 3. May 31, 2022: 14:00-14:15
- ☐ I want to see other options

Confirm



Powered by BOTNATION AI



Here are three available time slots for Banko Hertogstraat, please choose one:

2. May 30, 2022: 11:15-11:30



Your appointment is confirmed. Below you will find the details of your appointment:

- Branch: Banko Hertogstraat (Hertogstraat 16, 6511 SC Nijmegen)
- Time: 11:15-11:30
- Representative: Mrs. Stella Griep

To receive a confirmation email, please provide your email address.

karel.willems@gmail.com




Thank you. A confirmation email is sent to your email address. Please show this email at your appointment as verification. Do you have any other questions for me?


Type a message




Powered by BOTNATION AI

## Search context – angular typeface


 Hello, I am the virtual assistant of Banko. I am trained to answer your requests.

 How can I assist you?


I want to make an appointment

 For what purpose do you want to make an appointment?

Insurance

 Ok. Where do you want to have the appointment?

Nijmegen

Type a message 

Powered by BOTNATION AI



Ok. Where do you want to have the appointment?

Nijmegen



In the area of Nijmegen, the closest Banko branch is on Hertogstraat 16, 6511 SC Nijmegen.



**Here are three available time slots for Banko Hertogstraat, please choose one:**

- ☐ 1. May 30, 2022: 9:00-9:15
- ☐ 2. May 30, 2022: 11:15-11:30
- ☐ 3. May 31, 2022: 14:00-14:15
- ☐ I want to see other options

Confirm



Powered by BOTNATION AI





Here are three available time slots for Banko Hertogstraat, please choose one:

2. May 30, 2022: 11:15-11:30



Your appointment is confirmed. Below you will find the details of your appointment:

- Branch: Banko Hertogstraat (Hertogstraat 16, 6511 SC Nijmegen)
- Time: 11:15-11:30
- Representative: Mrs. Stella Griep

To receive a confirmation email, please provide your email address.

karel.willems@gmail.com



Thank you. A confirmation email is sent to your email address. Please show this email at your appointment as verification. Do you have any other questions for me?

Type a message



Powered by BOTNATION AI



Your appointment is confirmed. Below you will find the details of your appointment:

- Branch: Banko Hertogstraat (Hertogstraat 16, 6511 SC Nijmegen)
- Time: 11:15-11:30
- Representative: Mrs. Stella Griep

To receive a confirmation email, please provide your email address.

karel.willems@gmail.com



Thank you. A confirmation email is sent to your email address. Please show this email at your appointment as verification. Do you have any other questions for me?

No



I hope to have informed you sufficiently. For more information visit [www.banko.nl](http://www.banko.nl).

| type a message



Powered by BOTNATION AI



Your appointment is confirmed. Below you will find the details of your appointment:

- Branch: Banko Hertogstraat (Hertogstraat 16, 6511 SC Nijmegen)
- Time: 11:15-11:30
- Representative: Mrs. Stella Griep

To receive a confirmation email, please provide your email address.

karel.willems@gmail.com



Thank you. A confirmation email is sent to your email address. Please show this email at your appointment as verification. Do you have any other questions for me?

No



I hope to have informed you sufficiently. For more information visit [www.banko.nl](http://www.banko.nl).

Type a message



Powered by BOTNATION AI

## Credence context – curved typeface

een paar seconden geleden



Hello, I am the virtual assistant of Banko. I am trained to answer your requests.



How can I assist you?

I want to open a bank account



For opening a bank account, please provide your date of birth. The format of your answer should be as follows: DD-MM-YY.

01-02-1997



According to your age, you are eligible for opening a bank account. Please provide your phone number. The format of your answer should be as follows: +00 6 012345678.

| type a message



Powered by BOTNATION AI

01-02-1997



According to your age, you are eligible for opening a bank account. Please provide your phone number. The format of your answer should be as follows: +00 6 012345678.

+31 6 23722845



A registration link has been sent to your phone number. Enter the 8 digits you have received.

1920 2816



To proceed with your application, please upload a copy of your identification (passport or ID-card).

Upload identification



Type a message



Powered by BOTNATION AI



Now please upload a photo of your face to complete verification.



Photo....



You are verified. Please download our mobile Banko application from the App Store / Google Play Store. Sign up in the application with the following activation code 1845 and digitally sign the documents that are presented to you. Once the registration is finished and accepted, you will receive a confirmation message with your bank account details and more information on when you will receive your card.

Do you have any other questions for me?

No



I hope to have informed you sufficiently. For more information visit [www.banko.nl](http://www.banko.nl)

Type a message



Powered by BOTNATION AI

## Credence context – angular typeface

een paar seconden geleden



Hello, I am the virtual assistant of Banko. I am trained to answer your requests.



How can I assist you?

I want to open a bank account



For opening a bank account, please provide your date of birth. The format of your answer should be as follows: DD-MM-YY.

01-02-1997



According to your age, you are eligible for opening a bank account. Please provide your phone number. The format of your answer should be as follows: +00 6 012345678.

Type a message



Powered by BOTNATION AI



According to your age, you are eligible for opening a bank account. Please provide your phone number. The format of your answer should be as follows: +00 6 012345678.

+31 6 23722845



A registration link has been sent to your phone number. Enter the 8 digits you have received.

1920 2816



To proceed with your application, please upload a copy of your identification (passport or ID-card).

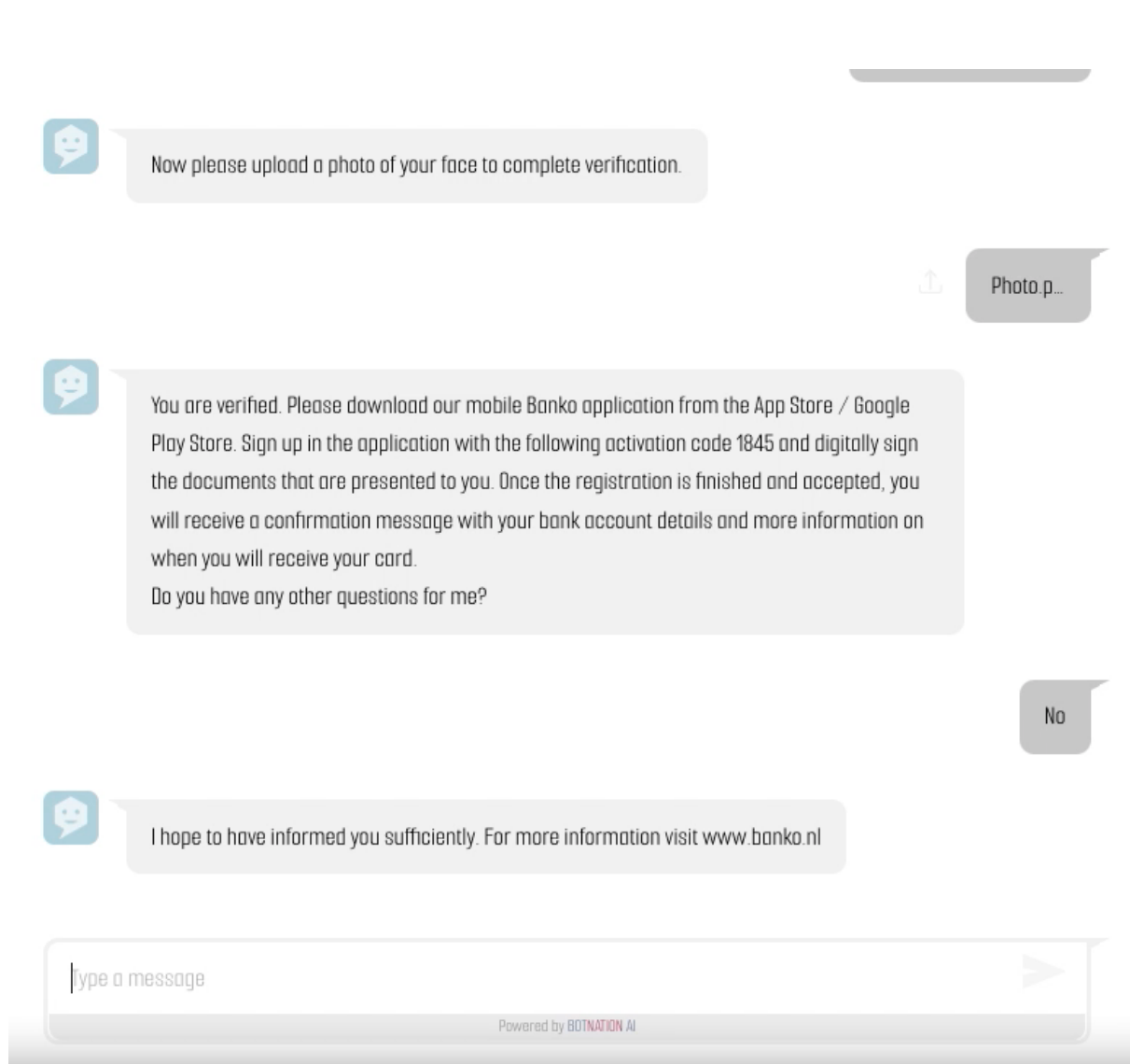
Upload identification

Type a message



Powered by BOTNATION AI





## Appendix 6: Measurements

### CX – Hedonic experience

I have found the interaction with the chatbot:

- Not fun – fun
- Dull – Exciting
- Not delightful – delightful
- Not thrilling – thrilling
- Enjoyable – Unenjoyable

### CX – Utilitarian experience

I have found the interaction with the chatbot:

- Effective – ineffective
- Helpful – unhelpful

- Functional – not functional
- Necessary – unnecessary
- Practical – impractical

### **Perceived risk**

Based on the scenario that you just saw; how risky do you feel it would be for you to interact with the chatbot?

Based on the scenario that you just saw; how likely does it feel for you that the interaction with the chatbot can lead to a loss, because of:

- Financial risk involved
- Performance failure of the chatbot
- The time involved in solving problems with the chatbot features
- The way that is dealt with your privacy regarding the information and documents you have sent to the chatbot

### **Customer satisfaction**

How do you feel about your overall experience of using the chatbot?

- Very dissatisfied – very satisfied
- Very displeased – very pleased
- Very frustrated – very contented
- Very unpleasant – very pleasant

### **Customer loyalty**

How much do you agree with the following statements?

- I intend to continue using a chatbot like this in the future.
- I will always try to use a chatbot like this if this is possible.
- I will strongly recommend others to use this chatbot.

### **Typeface curvature preference**

Which of the following typefaces looks more attractive to you?

### **Attitude towards technology/chatbots**

How much do you agree with the following statements?

- I prefer to encounter services digitally rather than face to face.

- If I could choose freely, I would choose to encounter services through a chatbot, rather than face to face.

**Previous experience**

How many times have you been served by a chatbot in the past?

**Mood**

You would say your mood before watching the video was?

**Demographics**

What is your age?

What is your gender?

What is your highest finished education?

How would you define your level of English level?