Creating warmth through visual hierarchy in UX design; enhancing engagement and social connectedness with a charity website

A study focused on enhancing engagement and social connectedness on a charity website by creating a feeling of warmth through the strategic use of shape, colour, and typography visual hierarchy design cues in UX design.

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Abstract

Charities in the Netherlands are confronted with difficulties in recruiting volunteers and obtaining donations, despite the increasing importance of assisting those in need. Therefore, it is essential to investigate how the perceived warmth of a website's user experience (UX) design affects social connectedness and engagement with a charity. Previous research has demonstrated that creating a feeling of warmth can enhance engagement and social connectedness, as these factors are linked.

This study provides insights into how to create a relationship with a charity through a website, using visual hierarchy design cues of shape, colour, and typography on feelings of warmth, social connectedness, and engagement. The cues that naturally attract the eye first, according to Gestalt principles, are shape, colour, and typography.

Eight website mock-ups were created with warm and/or cold visual hierarchy design cues to measure how colour (warm; yellow based opposed to cold; blue based), shape (warm; soft rounded opposed to cold; hard angular), and typography (warm; rounded legible opposed to cold; square illegible) affect feelings of warmth and therefore social connectedness and engagement. This is done in a 2 x 2 x 2 experimental research design.

The results showed that typography has a significant effect and shape a marginal effect on the User Experience of a charity website. Next to that, effects of warm shapes, colours, and typography on feelings of warmth, engagement, and social connectedness were found. Only marginally significant interaction effects were found that point into the expected direction. This suggests that visual stimuli alone are not enough to influence a website user.

Furthermore, congruency is found when warm colours and typography and cold shape is used. Shape had a very weak effect throughout the analyses. This indicates that aesthetics, design trends, or trustworthiness is deemed more important in shape.

Keywords: visual hierarchy, shape, typography, colour, UX design, engagement, feelings of warmth, social connectedness

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1.Introduction

In the Netherlands, charities play a crucial role by addressing societal needs, providing support for vulnerable people, promoting social welfare, and supporting governmental efforts in social issues. Despite their crucial role, charities are experiencing difficulties with recruiting and retaining volunteers as well as establishing connections with companies (Centraal Bureau voor de Statistiek, 2022). Approximately one-third of volunteers state that their paid employer does not acknowledge their charitable activities by permitting volunteering during work hours or by offering financial or material support to charities (Centraal Bureau voor de Statistiek, 2022). Charities such as the Barendrechtse Uitdaging, who rely on external companies for resources, supplies, people, and services, struggle to establish connections with those companies.

This study explores the usage of a feeling of warmth in User Experience (UX) design elements on a website to create a connection between a company and a charity by enhancing engagement and social connectedness with a charity. UX design is a complex technique that aims to create a meaningful and enjoyable experience for users. It is based on a variety of design, psychology, and human interaction principles. Understanding consumers' needs, habits, and preferences is necessary to inform the design process.

A feeling of warmth can aid in creating a connection between a company and a charity. Physical and emotional warmth have been associated with pro-social behaviours, cognitions, and altruistic behaviours (Hu et al., 2016 & Williams & Bargh, 2008). Design cues on a website can evoke a feeling of warmth. The cues that will be used for this study are shape, colour, and typography. The Gestalt principles, as described by Chapman (2018), indicate that the eye is initially drawn to these elements when observing a design.

First of all, the shape of an element on a website can affect how warm a design is perceived. According to Vartanian et al. (2013), the use of soft, rounded shapes can create a sense of warmth. As curved shapes, are typically associated with something cuddly, soft, and inviting, making the experience feel warmer (McManus et al., 1983).

Furthermore, colour can be used to convey meaning and assist users in differentiating between design elements (Voorveld et al., 2018). In this hue temperature plays a key role in determining whether a colour is seen as cold or warm (Kuehni, 2012). Therefore, yellow-based colours are considered to be warm and are associated with pro-social and altruistic personality and behaviour traits (Wright, 1984).

Lastly, typography's primary purpose is to enhance legibility by using font size, line lengths, line spacing, and font type (Dyson et al., 2008). UX designs with legible typography tend to feel more credible (Van der Meijden & Schijven, 2002), which can positively influence the emotional experience (Cuddy et al., 2008; Schnall et al., 2010). Therefore, using a warm legible, small, and curved typography can create a feeling of warmth.

Creating a feeling of warmth using design cues can enhance engagement and social connectedness. First of all, using warm design cues can create positive emotions and higher levels of engagement have been linked with overall satisfaction of website design (O'Brien & Toms, 2008). Users are inclined to remain on a website and engage with its content if they find the design pleasing (Liu & Stasko, 2010). In addition, social connectedness is a concept that can be defined as an individual's sense of belonging and connection to others. The neural activity for physical and social warmth is located in the same brain region (Inagaki & Eisenberger, 2013). Thus, experiencing psychological warmth on a webpage can enhance engagement and social connectedness.

Minimal research has been conducted on how the feeling of warmth can enhance engagement and social connectedness with a charity. This study contributes to the understanding of how visual hierarchy design cues (shape, colour, and typography) can enhance warmth, engagement, and social connectedness with a charity. Designers can apply the knowledge to enhance the effectiveness of designed materials and create a connection, whether in marketing, user interfaces, or physical spaces for charities.

Prior research has primarily concentrated on individuals regarding feelings of warmth, engagement with websites, and social connectedness to charities. Since companies consist of individual employees, previous studies can be applied in the theoretical framework of this

study. This study expands the knowledge on integrating a feeling of warmth into website design to enhance engagement and social connectedness and therefore create a connection between companies and charities. The following research question will be explored in this research: "*How can the use of visual hierarchy website design cues in UX design (colour, shape, and typography) create a feeling of warmth and enhance engagement with a charity?*"

The main research question is going to be answered by investigating the impact of warmth, engagement, and social connectivity on the Dutch charity Barendrechtse Uitdaging (BU). Chapter 2 of this study provides a theoretical framework that includes a literature review of past studies. The research methodology in Chapter 3 includes two preliminary studies, a focus group, and the main experiment to examine how shape, colour, and typography affect warmth, engagement, and social connectedness with BU. The experiment results are then presented in Chapter 4. Chapter 5 contains the discussion of the results, research limitations, recommendations for future research, theoretical and practical implications, and the conclusion. Lastly, the references are presented in Chapter 7 and appendices can be found in Chapter 8.

The Barendrechtse Uitdaging is a local organisation affiliated with a national foundation known as De Nederlandse Uitdaging. This foundation presents itself as the social broker in The Netherlands, facilitating the matching of companies with foundations to exchange materials, media, or labour. Each project is considered a challenge and aims to assist individuals in need (Coöperatie de Nederlandse Uitdaging, 2023). The national foundation consists of 30 local foundations. This study will concentrate on the establishment in Barendrecht, a small municipality in The Netherlands. The Barendrechtse Uitdaging, now referred to as BU, aims to encourage firms of all sizes to engage in social activities and contribute to the local community (Stichting de Lokale Uitdaging, 2022).

2. Theoretical Framework

This chapter collects and structures knowledge gathered from previous research to establish a foundation and framework for the current study. Hypotheses will be formulated, a research model will be developed, variables will be discovered, and keywords will be defined based.

2.1 User Experience Design

User experience (UX) refers to the manner in which a user interacts with and experiences a product, system, service, or website (Cambridge Dictionary, n.d.-c). The foundation of UX is based on a variety of design, psychology, and human interaction principles. UX serves a variety of functions, including but not limited to facilitating user engagement, promoting events, converting sales or donations, and acquainting users with the brand (Lewis, 2021).

One aspect of UX is the concept of experience, which has been defined numerous times throughout the years. Experience in UX can be divided into two components. The first conceptualisation defines experience as meaningful and personally encountered events that transform into recollections and narratives (Hassenzahl, 2011). The second conceptualization highlights knowledge gained through actual experience, as stated by Hassenzahl (2011). This study largely focuses on the first conceptualization of user experience of a charity website.

The way a user feels and behaves is influenced by how their expectations, goals, and emotions interact with the design's capabilities, limitations, and characteristics (Hassenzahl, 2010). Users typically evaluate their experience based on their emotional responses, such as enjoyment or annoyance (Hassenzahl, 2008). In addition, design aesthetics can have a significant effect on user satisfaction and behaviour, ultimately affecting website engagement (Lindgaard et al., 2006). This emphasizes the importance of the psychological and social

context of the user when creating engaging and meaningful designs. Therefore, experience in UX design is subjective because it involves emotional factors.

Overall, the research shows that UX design is complex and requires comprehension of cognitive, emotional, and contextual factors that influence the user experience. It is essential to prioritise users' demands in UX design to ensure a positive and satisfying experience. Emphasising UX in website design enables a charity to establish stronger and effective connections with their intended audience.

2.2 Engagement

Engagement is the level of involvement, interest, and attention that a person has in an activity or experience (Cambridge Dictionary, n.d.-b). Higher levels of engagement are positively associated with overall satisfaction in using technology, such as websites (O'Brien & Toms, 2008). Users are more likely to return to and interact with a website if they find the design visually appealing, as stated by Liu and Stasko (2010). Thus, user engagement with a charity is significantly impacted by the user experience (UX) design of a website.

This study defines engagement based on Fredricks et al.'s (2004) three-dimensional model of engagement. Behavioural engagement, to begin with, refers to the extent to which an individual actively participates in and exerts effort towards a particular mission or activity. Emotional engagement refers to a person's emotional involvement and impact throughout a task or activity. Furthermore, cognitive engagement is how much a person uses cognitive processes and abilities to comprehend a task or activity and improve their skills at it.

It can be argued that the three dimensions of engagement by Fredricks et al. (2004) all influence UX design. Hassenzahl (2008 & 2010) claims that UX design has the ability to affect an individual's emotional response. And Lindgaard et al. (2006) states that design aesthetics can have a substantial influence on user behaviour, satisfaction, and engagement.

Ultimately, website engagement is essential for improving user experience and encouraging consumers to further interact and commit to the service, website, or activity.

This increased commitment leads to lasting benefits for both customers and companies. Finally, website involvement is not only desirable, but also necessary for creating an entertaining and effective user experience.

2.3 Feelings of warmth

Warmth is the focus of this study for a number of reasons. To begin with, it has been demonstrated that warmth is a fundamental need for development, attachment, and thermoregulation of primates, including humans (Harlow, 1958; Ijzerman et al., 2015). This might be because newborns feel their mother's warmth in their first days (Lee & Min, 2022). Later in life, the carer has close physical contact with the baby, which may create an association between physical warmth and social warmth (Lee & Min, 2022). Due to the same brain region being used for physical and social warmth (Inagaki & Eisenberger, 2013).

In addition, research has shown that warmth can enhance pro-social and altruistic behaviour (Barsalou, 1999; 2008. Hu et al., 2016; Schubert, 2005; Landau, 2010), as well as generous behaviour (Williams & Bargh, 2008). Assisting others with improving their emotional well-being and connection, despite the cost of the helper's resources, provides a sense of warmth for both parties involved (Hu et al., 2016). It can be argued that warmth can be used to enhance pro-social and charitable behaviour towards a charity.

Thirdly, Ijzerman et al. (2015) suggests that individuals interpret a feeling of warmth as an indicator of strong social and emotional resources and connection. The sense of social connectivity can be triggered by external stimuli like psychological or physical warmth (Lee & Min, 2022). Experiencing physical warmth can lead to positive behaviour and attitude towards others, facilitating social connectedness (Schnall et al., 2010). Consequently, social connectedness is associated with the feeling of warmth, and creating a sense of social connectedness can be conducted by evoking a psychological sensation of warmth.

Previous studies established a correlation between engagement and a sense of warmth; therefore, it is suggested that experiencing warmth in social or digital interactions

can enhance engagement. A study done by Inesi et al. (2012) argues that experiencing interpersonal warmth can enhance engagement and collaboration. This suggests that having a feeling of warmth can lead to enhanced engagement and collaboration with a charity. As helping other people can create a feeling of warmth (Hu et al., 2016). Another study found that experiencing emotional warmth while doing a somewhat uninteresting or unpleasant task can increase engagement (Koo & Fishbach, 2012).

Furthermore, sensory design cues can significantly contribute to creating human warmth, social connectedness, and engagement. This is achieved through the use of interactions that evoke positive emotions and associations. For example, users' perceptions of a website's trustworthiness and friendliness were increased when warm elements were included into the design of a website (Lee & Lee, 2010). It can be argued that the intentional use of sensory stimuli can enhance user experiences, positive emotions, and create a sense of emotional connection and empathy (Choi & Lee, 2017; Lee & Lee, 2010; Obrist et al., 2017).

In conclusion, feeling psychological or physical warmth can enhance pro-social and altruistic behaviour. Warm design elements on a website can evoke a feeling of warmth. Which can trigger a person to be more engaged, show more pro-social behaviour, and therefore participate in a charity by doing something good.

2.4 Social Connectedness

Social connectedness refers to an individual's feeling of belonging and attachment to others. Components of the concept include intimacy, perceived support, a sense of obligation towards others, and shared identity (Lee & Robbins, 1995). Emotional intimacy refers to how emotionally attached and connected individuals feel to others (Lee & Robbins, 1995). Additionally, perceived support applies to the perception that someone has access to emotional, instrumental, or informational support from others when required (Lee & Robbins, 1995). Shared identity refers to the level to which individuals perceive shared values, beliefs,

experiences, and being connected to a broader social community (Lee & Robbins, 1995). Lastly, a sense of obligation to others relates to the feeling that one has a responsibility to provide care for others and contribute to their overall welfare (Lee & Robbins, 1995).

Research suggests that a person is more likely to exhibit altruistic behaviour when higher levels of social connectedness are present (Lee & Min, 2022; Borgonovi & Andrieu, 2019). This is demonstrated through participation in volunteer work or charitable activities. Social connectedness can enhance resilience, positive feelings, and pro-social behaviour such as volunteering and showing kindness to others (Baumeister & Leary, 1995; Jetten et al., 2012).

Consequently, it might result in an increased feeling of social responsibility and a drive to improve the welfare of the community (Borgonovi & Andrieu, 2019). This suggests that a strong desire and sense of social responsibility increase the likelihood of an individual partaking in charitable activities. Therefore, it is crucial to promote philanthropic contributions and involvement with non-profit organisations (Riordan & Vandenberg, 2015).

Social connectedness is linked to positive emotions such as warmth, gratitude, empathy, and altruism (Fredrickson, 2004). These positive emotions can be enhanced through design cues that highlight the impact of charitable giving and create a sense of shared identity and purpose (Kim & Lee, 2019). Therefore, making use of design cues that create feelings of warmth can evoke a sense of social connectedness.

Individuals are more inclined to contribute time, money, and resources to a charity when they experience a strong connection and sense of belonging to the organisation (Cacioppo et al., 2015). Therefore, when an individual feels socially connected, they may push the company to participate in or collaborate with a charity, as they can advocate for its importance.

2.5 Visual Hierarchy

The human senses can have a big impact on human behaviour because humans make decisions every second of the day based on stimuli from the outside world (Owie et al.,

2017). The sense of sight is the most dominant sense because 80% of the information that humans perceive from their surroundings is obtained through visual cues (Farnè & Làdavas, 2002). Furthermore, the human brain processes visual information faster and more efficiently than information from other sensory inputs (Driver & Spence, 2000; Turvey, 1977).

Through stimulating certain senses, such as the sense of sight, behaviour changes may occur (Lawless, 1991). The cause of this lies in our brain, as we associate and connect certain things, such as shapes and colours, with old experiences (Lawless, 1991). Stimulating the human senses can cause an individual to show behaviour associated with the feeling of that experience. If a certain behaviour is wanted, such as engagement with a brand, specific human senses can be triggered to create that behaviour.

Visual hierarchy is the arrangement of design elements to communicate the relative importance of each element and help the user navigate the design. It is based on the six Gestalt principles of design (see Figure 2). According to eye-tracking studies, people typically scan websites in an F-shape, paying particular attention to the top and left sections of the page (Nielsen, 2006).

Designers can establish a feeling of organisation and order by placing elements in a way that makes it easier for users to navigate the webpage (Lidwell et al., 2010). Which can create familiarity and predictability in a design. Additionally, it can assist users in comprehending and establishing a design's sense of structure, order, and reliability, which can increase the user's sense of comfort, engagement, and welcome (Everdell, 2014; Sonderegger & Sauer, 2010). Positive emotional reactions are the result of all of this (Lidwell et al., 2010). Each of these factors can make a user feel more at ease with a design, which creates a positive emotional response and therefore a feeling of warmth.

Figure 2

Gestalt principles (Chapman, 2018).
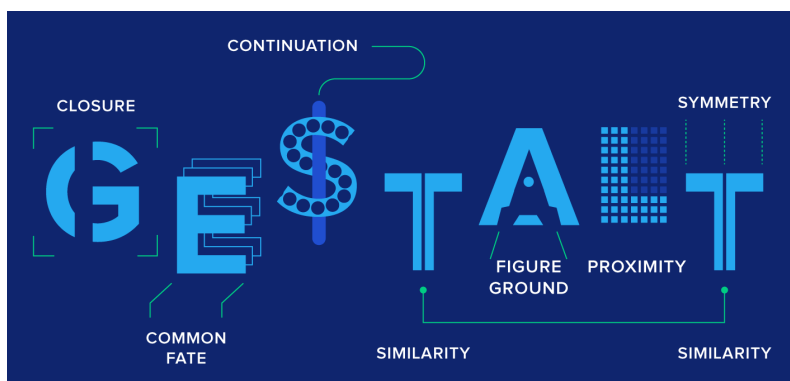
Headlines, subheadings, lists, and text blocks with a background all naturally catch the attention of the human eye (Everdell, 2014). According to Nielsen (2006), Dyson et al. (2008), and Müller et al. (2011), colour, shape, alignment, and typography are all visual elements that affect how the design is perceived. Attention to important information can be guided with the help of a well-designed user experience (UX) with a distinct visual hierarchy. However, poor colour schemes or disorganised layouts can make it difficult to navigate and find what we need.

Designers can produce more captivating experiences that are likely to catch people's attention and leave an impression. For instance, Choi & Lee's (2017) study discovered that the use of colour and visual components can improve user engagement and elicit happy feelings.

2.5.1 Shape

The use of hard, angular, sharp, and soft, rounded, smooth shapes can influence how warm a design is perceived. Users tend to associate hard, angular shapes with coldness and distance and soft, rounded shapes with warmth (Vartanian et al., 2013). McManus et al. (1983) found that curved lines are more likely to evoke good emotions compared to straight lines. The arrangement of shapes, in combination with other design elements, can influence the perceived warmth of a design. Designs that combine both soft and hard shapes create a

feeling of balance and contrast, leading to a more complex emotional reaction (Hekkert et al., 2007).

Embodied cognition is the psychological concept that suggests physical qualities of an object can impact emotional and cognitive reactions (Barsalou, 2008). This can explain the relationship between forms and feelings of warmth. Soft shapes can evoke feelings of warmth due to their association with cuteness or physically soothing products like pillows.

H1: Soft and rounded shapes, opposed to hard and angular shapes, will enhance a feeling of warmth.

H2: Soft and rounded shapes, opposed to hard and angular shapes, will enhance engagement.

H3: Soft and rounded shapes, opposed to hard and angular shapes, will enhance social connectedness.

2.5.2 Typography

Typography is the process of arranging text on a page in an organised and visually pleasing manner by choosing fonts, sizes, styles, and spacing. Certain font types can enhance readability and make information more appealing and approachable (Dyson & Haselgrove, 2001; Morris & Akselsen, 2016). For example, typography styles that use a plain typeface without decorative strokes (sans-serif fonts) along with large font sizes (Dyson & Haselgrove, 2001; Morris & Akselsen, 2016). Additionally, using appropriate line length, font size, and line spacing can enhance reading speed, readability, understanding, and scanability (Dyson et al., 2008).Typography is made of various cues, which together form one font style. The cues that are relevant to this study and affect the typography are legibility, style, and size.

Typography's primary role is to ensure text is readable (legibility), which can be affected by font type, font size, font length, and font spacing (Dyson et al., 2008). It can also

affect the perceived reliability and trustworthiness of a design by users. Legible typography enhances the authenticity of designs (Van der Meijden & Schijven, 2002). According to Cuddy et al. (2008) and Schnall et al. (2010), warmth and trustworthiness have a positive influence on each other. Positive feelings and a sense of warmth can aid in building credibility and trustworthiness (Cuddy et al., 2008 & Schnall et al., 2010). Thus, establishing reputation and trustworthiness may lead to a sense of warmth.

Curved and angled lines can influence the emotional response to a design (Huang et al., 2016). Curved designs convey friendliness, approachability, and warmth, while angular shapes evoke formality and coldness (Cheng & Tham, 2017 & Huang et al., 2016).

The font size influences how a user perceives a design. Cavanaugh et al. (2017) stated that using a larger typeface can enhance readability and make reading easier, leading to a pleasant emotional reaction. An excessively large typeface may be seen as screaming, leading to a negative emotional response. A larger font size can enhance the perception of friendliness, especially when used in conjunction with other signals to evoke a warm and positive emotional reaction (Gobert & Buckley, 2000). An overview of the various typographic cues and their anticipated impacts on a feeling of warmth and engagement can be found in Table 1.

Table 1

Overview typography cues and its effects

Cues	Warm or cold	Engagement
Legibility		
Legible	Warm	High
Illegible	Cold	Low
Font style		
Angled	Cold	Low
Curved	Warm	High
Font size		
Small	Cold	Low
Large	Warm	High

H4: Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance a feeling of warmth.

H5: Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance engagement.

H6: Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance social connectedness.

2.5.3 Colour

Colour is an essential aspect of visual design that can influence how a user perceives a website. According to Müller et al. (2011), designs that employ contrast-enhancing colours can enhance readability and simplify the interpretation of content. Additionally, colour can be used to convey meaning and help users distinguish between various elements (Voorveld et al., 2018). All of this contributes to a design's visual hierarchy.

Hue temperature, which is a physical characteristic of light, determines whether a colour is warm or cold (Kuehni, 2012 & Wright, 1984). Warm perceived colours are yellow-based because they have a colour temperature that is close to the yellow-red region of the light spectrum (Kuehni, 2012). Warm colours are typically associated with positive emotions due to the physiological associations of warm colours with warm objects (Leder et al., 2015). According to Kuehni (2012) and the Wright Theory of colour (1984), colours that are perceived as cold have a colour temperature that is closer to the blue end of the light spectrum, making them blue-based colours. They are mostly associated with negative emotions; however, they can also be associated with positive emotions such as relaxation and calmness (Leder et al., 2015).

In the Wright theory, warm colours are associated with pro-social and altruistic personality and behaviour traits (Wright, 1984). Warm colours can affect behaviour and will give off a warm feeling. Therefore, warm colours stimulate a feeling of warmth, which stimulates altruistic behaviour.

There are four groups of colours in the Wright Theory (1984), of which two are considered to be warm colours. Namely, group 1 morning light (see Figure 2) contains delicate and clear colours that have very little black in them; it is considered to be more spring-like. If misused, this colour group can be perceived as insubstantial, frivolous, and cheap (Wright, 1984). Secondly, group 3 firelight (see Figure 3) exists of more intense and subtle colours with high chromatic values, and with the addition of some black, yellow, or red, it is considered to be more autumn-like (Wright, 1984). If misused, this colour group can be perceived as heavy, old-fashioned, boring, predictable, and bossy (Wright, 1984).

A feeling of warmth is easily associated with autumn-like colours, as autumn reminds people of warmth. Dr. Ben-Shahar Tal, lecturer at Harvard University, said in an interview that "Many things associated with fall automatically illicit warm feelings." (Hogeveen, 2018). Things associated with autumn that can give a warm feeling are, for instance, warm drinks, candles, fireplaces, warm smells, cosiness, comfy sweaters, and amber colours in nature, as well as warm feelings like comfort, excitement, cheerfulness, and optimism (Hogeveen, 2018). Therefore, the colours in this study will be based on group 3 firelight.

Figure 3   *Figure 4*

Colour group 1: Morninglight   *Colour group 3: firelight*

In this study, a combination of red, orange, blue, and green will be used. The combination of these four colours can be explained by the combination of colours that create

a feeling of warmth and a feeling of trustworthiness for companies. These colours are also contrasting, consisting of two primary and their two complementary colours (see Figure 5). Contrast refers to the variance between elements in terms of colour, luminance, or texture. Designers can emphasise crucial information and direct the user's focus by establishing a contrast between elements (Lohse & Hertel, 2010). As well, using a bright colour for a call-to-action button can draw the user's attention and encourage interaction (Pierce & Cheney, 2018).

Figure 5

Colour wheel (Image of colour wheel, 2013)
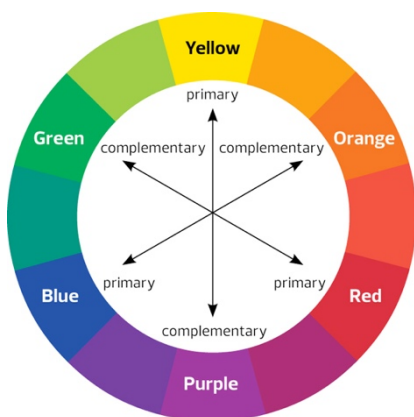
Red: In the Wright Theory (1984) red is described as a colour that is very powerful and grabs a person's attention first. It represents courage, strength, warmth, energy, 'fight or flight', masculinity, and excitement.

Orange: In the Wright Theory (1984) orange is deemed a fun colour, and the reaction it creates is a combination of physical and emotional. Orange makes the human mind focus on physical comfort, food, warmth, shelter, security, sensuality, passion, abundance, and fun.

Blue: In the Wright Theory (1984) blue is considered to be a cold and calming colour that encourages intellectual activity, reason, communication, serenity, duty, reflection, coolness, and logic. Blue is also associated with competence, efficiency, and trustworthiness (van der Lans, van der Rijst & Hultink, 2010).

Green: In the Wright Theory (1984) green is considered to be a cold and calming colour that gives refreshment, harmony, rest, and reassurance. Furthermore, it symbolises love, environmental awareness, and peace. It is also associated with trust and credibility and is suggested to signal ethical behaviour and social responsibility (Kang & Hustvedt, 2013).

H7: Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance a feeling of warmth.

H8: Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance engagement.

H9: Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance social connectedness.

2.6 Congruency effects

Congruency in sensory UX design refers to the consistency and harmony between various visual hierarchy design cues. This involves harmonising sensory cues to create a cohesive user experience. Harmonious product elements make it easy for people to form an opinion (Fenko & Van Rompay, 2018). Visual hierarchy design cues, being elements of a digital product like a website, can also be considered to be processed in a similar manner.

The human brain is constantly processing stimuli. Therefore, humans prefer stimuli that are easy to process and do not require much cognitive processing (Spence & Velasco, 2018). Congruency makes the processing of product elements easier (Fenko & Van Rompay, 2018 & Velasco, Obrist & Spence, 2016). In this sense, the Gestalt principles are an example of unified sensory cues.

Furthermore, in a study done by Salgado-Montejo et al. (2014) it was found that consumers associate high congruency with positive emotions such as pleasure, fun, and happiness. Visual hierarchy design cues that are congruent with each other might enhance a feeling of warmth.

This study is using a cross-modal correspondence, the phenomenon that explains that sensory cues can evoke associations. When it comes to colours, this can be an association between a colour and warmth, such as yellow and the sun, green and grass, or blue and the sky. In terms of shape, this refers to the association between rounded forms and cosy, soft items. This can apply to typography in the shape of the letters and objects or the association between size and noise levels.

In conclusion, congruent visual hierarchy design cues can enhance a feeling of warmth as congruent cues create positive emotions such as attractiveness. Therefore, it is possible to argue that the various cues can influence one another.

H10: Congruent visual hierarchy cues as opposed to incongruent visual hierarchy cues will create website attractiveness.

2.6 Conceptual Model & Hypotheses

The conceptual model central to this research is displayed in Figure 6. An overview of

hypotheses can be found in Table 2.

Figure 6

Conceptual model

Visual hierarchy

Independent variables   *Dependent variables*
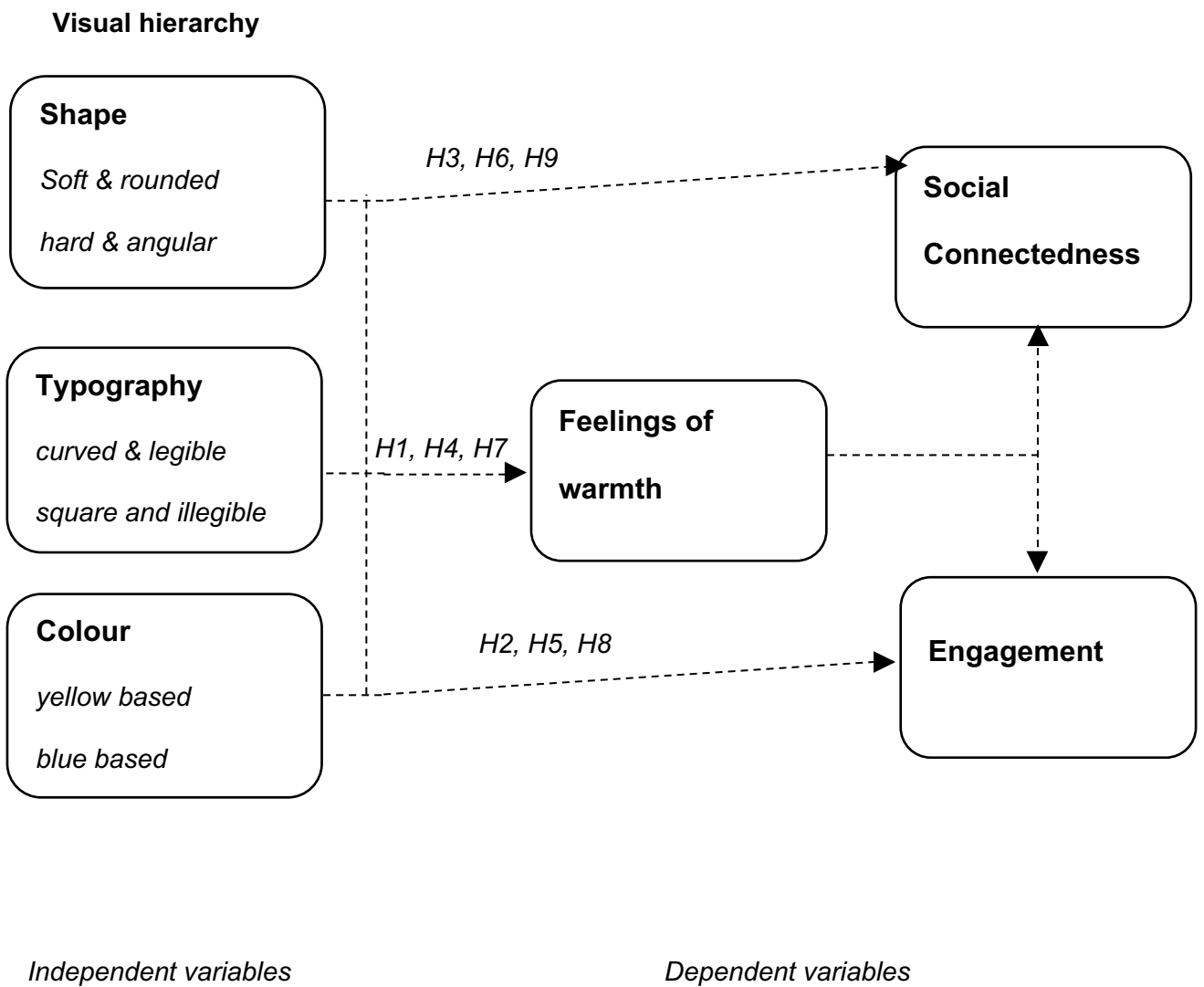
Table 2

Overview of hypotheses

Hypotheses	
H1	Soft and rounded shapes as opposed to hard and angular shapes will enhance a feeling of warmth.
H2	Soft and rounded shapes as opposed to hard and angular shapes will enhance engagement.
H3	Soft and rounded shapes as opposed to hard and angular shapes will enhance social connectedness.
H4	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance a feeling of warmth.
H5	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance engagement.
H6	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance social connectedness.
H7	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance a feeling of warmth.
H8	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance engagement.
H9	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance social connectedness.
H10	Congruent visual hierarchy cues as opposed to incongruent visual hierarchy cues will create website attractiveness

3. Methods

3.1 Research Design

To provide answers to the research question and hypotheses, an experimental research design was used to investigate the effects of shape, colour, and typography on feelings of warmth, engagement, and social connectedness. The visual design cues are selected based on the literature and the company that this study is using for context, Barendrechtse Uitdaging (BU).

The independent variables of this study are shape (hard opposed to soft shapes), typography (curved & legible opposed to square & illegible) and colour (warm opposed to cold colours) of a website design. This results in a 2 x 2 x 2 experimental research design with eight experimental conditions (see Table 3). The dependent variables of this study are a feeling of warmth, social connectedness, and engagement. It is assumed that when the website mock-ups are congruent, the three independent variables positively affect engagement, social connectedness, and a feeling of warmth.

Table 3

Experimental conditions

Experimental condition	Colour	Shape	Typography
1	Warm	Warm	Warm
2	Warm	Warm	Cold
3	Warm	Cold	Warm
4	Warm	Cold	Cold
5	Cold	Warm	Warm
6	Cold	Warm	Cold
7	Cold	Cold	Warm
8	Cold	Cold	Cold

Before conducting the main experiment, two preliminary studies were done to ensure the validity of the main experiment. The first preliminary study tested the visual hierarchy design cues that were used to manipulate the mock-ups of the website. And the second preliminary study tested the mock-ups themselves to ensure that the manipulations produced the desired effects as well as to identify any potential issues that may affect the results of the main experiment.

The questionnaire for the main study and the preliminary studies will be conducted via Qualtrics, an online survey platform. The questionnaires will be using a 7-point Likert scale. This allows participants to indicate their level of agreement or disagreement with the statements of the questionnaire and, therefore, the effectiveness of the design cue. Data will be collected and analysed using SPSS software.

3.2 Preliminary Study 1

The first preliminary study aimed to test the design cues that manipulate the visual hierarchy of the mock-ups for the main experiment. The design cues were identified based on the literature research.

The website mock-ups used in the main study have to provide strong stimuli for the participants in the main experiment. Therefore, the first preliminary study (Appendix 2) tested whether the design cues were perceived as warm or cold. Three different sets of design cues (Appendix 3) are presented to the participant in the online survey. Each set of design cues is based on one of the three independent variables in the visual hierarchy.

The participants of the preliminary study were family members and friends from the personal network of the researcher. This resulted in 12 participants *(N = 12)* in the preliminary test. Of which 8 are female *(67%)* and 4 are male *(33%)* between the ages of 31 and 77 years old *(M = 51.67)*.

3.2.2 Results

As this study is using a 7-point Likert scale, a mean between 1 and 3 is considered cold, between 3 and 4 is considered neutral, and between 4 and 7 is considered warm.

The first visual design cue participants were asked to evaluate was shape. The participants were shown six different shapes. As can be seen in Table 4, the shape that was perceived as the warmest was the oval. The shape that was perceived as the coldest was the square.

Table 4

Means and standard deviations of perceived warmth in shapes (N = 12)

Shape	Mean (M)	Standard Deviation (SD)	Cold/warm/neutral
1 – circle	3.67	1.75	Neutral
2 – square	2.75	1.16	Cold
3 – star	4.33	1.31	Warm
4 – square round corners	4.42	1.61	Warm
5 - hexagon	3.33	0.94	Neutral
6 - oval	4.92	1.04	Warm

Note: 7-point Likert scale (1 = Very unpleasant – 7 = Very pleasant).

The second visual design cue participants were asked to evaluate was colour. The participants were shown six different colours. The colour that was perceived as the warmest was red. The colour that was perceived as the coldest was dark blue. The results can be found in Table 5.

Table 5

Means and standard deviations of perceived warmth in colour (N = 12)

Colour	Mean (M)	Standard Deviation (SD)	Cold/warm/neutral
1 – dark blue	2.50	0.96	Cold
2 – yellow	5.42	0.64	Warm
3 – green	4.83	0.99	Warm
4 – light blue	4.08	1.38	Warm
5 - orange	5.67	1.25	Warm
6 - red	5.83	1.72	Warm

Note: 7-point Likert scale (1 = Very unpleasant – 7 = Very pleasant).

The third visual design cue participants were asked to evaluate was typography. The participants were shown six different typographies. The typography that was perceived as the warmest was Montserrat alternates. The typography that was perceived as the coldest was Montecarlo. The results can be found in Table 6.

Table 6

Means and standard deviations of perceived warmth in typography (N = 12)

Typography	Mean (M)	Standard Deviation (SD)	Cold/warm/neutral
1 – mondana	5.25	1.01	Warm
2 – montecarlo	3.00	1.73	Neutral
3 – montserrat alternates	5.33	1.03	Warm
4 – share tech mono	3.08	1.26	Neutral
5 - tomorrow	3.83	1.86	Warm
6 – xanh mono	3.83	1.72	Warm

Note: 7-point Likert scale (1 = Very unpleasant – 7 = Very pleasant).

3.2.3 Conclusion

The first preliminary test indicated that the visual design cues match the literature study done in the theoretical framework. It can be concluded that a round shape is perceived as the warmest shape. This affects both typography and shape. As typography can exist of square and round shapes in the letters. Furthermore, it can be said that yellow-based colours are perceived as warmest, with red being the warmest colour, followed up by orange and red. For the second preliminary test and the main experiment, the design cues will be used based on whether they are cold, neutral, or warm.

3.3 Preliminary Study 2

Preliminary study 2 was conducted to test the mock-ups that were created using the design cues identified in preliminary study 1. Eight different mock-ups were created based on the eight experimental conditions (see Table 3), the mock-ups can be found in Appendix 5, and the questionnaire can be found in Appendix 4.

The design cues were used to create manipulations of a mock-up, which aimed to influence the feeling of warmth and social connectedness. The order of presentation of the mock-ups was randomised to minimise order effects. The questionnaire can be found in Appendix 4.

The data collected from preliminary study 2 was used to evaluate the effectiveness of the manipulations and to further refine the design cues for the main experiment. The results of preliminary study 2 helped to ensure that the manipulations of the mock-ups were effective and that the main experiment would be able to answer the research question with increased internal validity.

The participants of the second preliminary study were family members and friends from the personal network of the researcher, as well as board members of BU. This resulted in a total of 16 participants, of whom 9 finished the survey. Only the participants who finished

the survey are viewed as valid. This results in 9 participants *(N = 9)* of whom 2 are female *(23%)* and 7 are male *(77%)* between the ages of 20 and 77 years old *(M = 51.33)*.

3.3.1 Control Question

In order to test whether the design that is perceived as warm, engaging, and socially connected is also the one that is suitable for the company, one control question was included. The control question aimed at determining the suitability of the design was phrased as follows: "I find the design of the webpage suitable for the company.".

3.3.2 Results

Table 7 presents an overview of all eight mock-ups and how the website is perceived based on the dependent variables (feelings of warmth, social connectedness, and engagement). The mock-ups are sorted based on the experimental condition, therefore, mock-up 1 corresponds with experimental condition 1, etc.

The mock-up that was perceived as the warmest, most socially connecting, and most engaging is mock-up 3 with warm colours, cold shapes, and a warm typography.

Table 8 presents the congruency effects of the mock-ups. The mock-up that is perceived as the most attractive is mock-up 3 (warm colour, cold shape, and warm typography), with a mean of *M = 5.44.*

Table 9 contains the control question that was included. This shows that despite mock-up 3 (warm colour, cold shape, and warm typography) being the most attractive and being perceived as the most socially connecting, engaging, and warmest, mock-up 1 with warm colours, warm shape, and warm typography is perceived as the most suitable.

Table 7

Means and standard deviations of mock-ups (N = 9)

Mock-up	Feelings of warmth		Social connectedness		Engagement		Total	
	M	SD	M	SD	M	SD	M	SD
1	4.89	1.85	4.89	1.45	5.33	1.63	5.04	1.64
2	5.11	1.29	4.89	1.37	3.89	1.79	4.63	1.48
3	5.44	1.26	5.44	1.17	5.56	1.07	5.48	1.17
4	4.33	1.63	4.33	1.63	4.11	1.52	4.25	1.59
5	4.56	1.57	5.00	1.15	4.89	1.20	4.82	1.31
6	3.78	1.93	3.89	1.66	3.44	2.01	3.70	1.86
7	4.11	1.66	4.89	0.99	4.78	1.13	4.59	1.26
8	3.89	2.08	4.00	2.00	3.67	2.11	3.85	2.06

Note: 7-point Likert scale (1 = Do not agree at all - 7 = Agree very much).

Table 8

Congruency effects

	Mock-up							
Attractivity	1	2	3	4	5	6	7	8
M	5.00	3.33	5.44	4.22	4.78	3.44	4.89	3.56
SD	1.76	1.56	1.17	1.31	1.13	2.01	1.37	2.27

Note: 7-point Likert scale (1 = Do not agree at all - 7 = Agree very much).

Table 9

Control question

	Mock-up							
Suitability	1	2	3	4	5	6	7	8
M	5.22	3.33	5.00	4.00	4.89	3.33	4.33	4.00
SD	1.31	1.41	0.82	1.33	1.37	1.89	1.49	1.89

Note: 7-point Likert scale (1 = Do not agree at all - 7 = Agree very much).

3.3.3 Conclusion

The second preliminary study showed that the mock-ups only have a small variance between them. They are all very closely related. The researcher got feedback from the respondents that the online survey was very confusing as the changes were small in each mock-up. As well as that, it took a long time to finish, as there were eight mock-ups to evaluate.

Despite that, there is a visible difference between the mock-ups. Mock-ups one to four have the dominant warm element of the colour red. These mock-ups are generally perceived as warmer than mock-ups five to eight, which have the dominant cold element of the colour blue.

It can also be seen that the means of mock-ups one, three, five, and seven are relatively higher. These mock-ups have a warm typography that was perceived as warm in preliminary study 1. Mock-ups one, two, five, and six are using soft, rounded shapes that were perceived as the warmest in preliminary study 1. Some respondents gave the researcher feedback that the oval-shaped buttons felt off to them. This creates incongruency in the design and might be why shape has less effect on the mock-up.

The effect of colour and typography is bigger than the effect of shape on the mock-ups. However, when the visual hierarchy elements are congruent with each other, as seen in mock-ups 1 and 3, the effect of the visual hierarchy elements is relatively higher.

Generally, the respondents found the mock-ups using mostly cold elements less suitable. This includes mock-ups four, six, seven, and eight. In addition, mock-up two is also perceived as less suitable. This mock-up uses cold typography and a warm shape and colour.

Therefore, it can be said that the mock-ups are generally fitting, except for the element of shape. This will be slightly redesigned for the main experiment, so congruency effects are more visible, and the effect of shape might increase. Furthermore, the distinction between the mock-ups, especially six and eight, are not very clear. To fix this, a focus group will be held.

3.4 Focus group

In preliminary study 2 mock-ups six and eight were perceived as almost identical. Despite condition six having a warm shape, cold colour, and cold typography and condition eight having a cold shape, cold colour, and cold typography. Furthermore, there was no very big difference between the cold and warm mock-ups. To solve this, a focus group was held. The participants in the focus group were a small group of people within the personal network of the researcher. This entails six people, of whom four are male and two are female, all between the ages of 28 and 60.

3.4.1 Procedure

The focus group was done using small interviews consisting of four questions and showing a variation of website mock-ups based on conditions six (cold colours, warm shapes, and cold typography) and eight (cold colours, shapes, and typography). The aim was to explore how to make the mock-ups more fitting to BU and their condition.

During the interviews, the first question that was asked was, "Which of the following images do you perceive as the coldest and why?" while showing mock-ups six and eight of preliminary study 2. The second question was "How would you make this image colder?" while showing mock-up eight. The third interview question was asked by showing condition eight using three variations in background image (see Figures 7, 8, and 9) and asking, "Which background image do you perceive as most neutral?". Followed by "Which of these images do you find most fitting to BU?".

Figure 7

Mock-up eight variation "Domino"
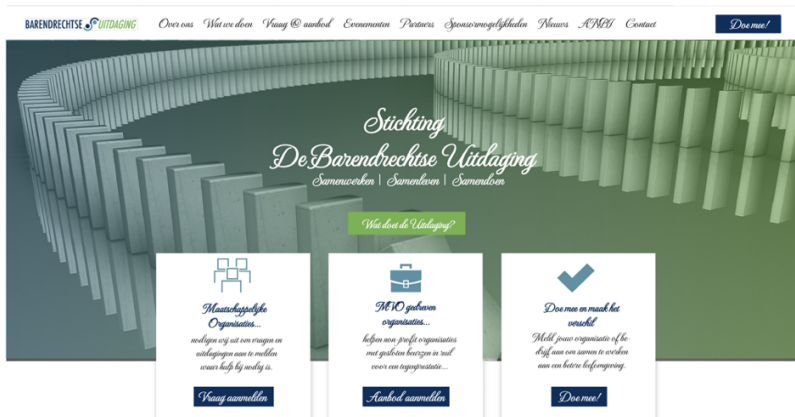
Figure 8

Mock-up eight variation "Hands"

Figure 9

Mock-up eight variation "People"

3.4.2 Results

During the focus group, the interviewee's answered the questions similarly. Mock-up eight with only cold visual hierarchy design cues was perceived as the coldest. According to the interviewee's, the website mock-ups can be made colder by using more dark blue accents as well as a more fitting background image. The domino variation of mock-up eight, which can be found in Figure 7, was perceived as the most neutral image but also seen as more distant. Lastly, the mock-up variation hands, which can be found in Figure 8, were seen as most fitting to BU. It represents trust, teamwork, and being stronger together.

Based on the results of the focus group, the decision to use the variation hands was made. The background image contains both cold and warm factors, as it represents teamwork while also using square shapes and straight lines. Therefore, variation hands was chosen for the main study to create a bigger differentiation between warm and cold, as well as mock-ups of six and eight.

Besides the background image of the website mock-up, the participants of the focus group said that using a more distinct colour blue would make the mock-ups colder. Therefore, in the mock-ups of the main experiment more dark blue and less green will be used.

3.5 Main study

3.5.1 Participants

The participants for this study are individuals within companies. As the main target group was Dutch companies, the survey was in Dutch.

Non-probability sampling was used to select participants using a consecutive sampling method. The selection process involved spreading the survey through both the network of Barendrechtse Uitdaging (BU) and the researcher through e-mail and social media. From there on, a snowballing effect was used to spread the survey even more. No

distinctions were made in terms of gender, nationality, or type of company. The participants must be working at a company; therefore, the age limitations are between 18 and 77 years old.

A response was considered valid upon completion of the questionnaire when the age of the respondents was between 18 and 78 and the respondents were working or used to work. By using this selection process, the study was able to gather data from a diverse group of individuals with different backgrounds and experiences, which increases the generalizability of the results.

In total, 199 people participated in the experiment. This results in 139 valid responses (N = 139), of which 96 are female (69.1%) and 43 are male (30.9%). The age of respondents lied between 19 and 78 (M = 47.53, SD = 14.75). The respondents are from different sectors; the selection of sectors is based on research done by CBS. This way, the results of the variance in sectors in the study are comparable with the average in the Netherlands. The most respondents are working in the following sectors: education (22.7%), health and welfare care (22%), and business services (10.6%).

The location of employment of the respondents lies between 0 and 100+ kilometre radius from Barendrecht. A majority of the respondents work within a 25-kilometre radius of Barendrecht (79.14%). Table 10 provides an overview of the participant characteristics per condition.

To analyse whether there were any differences between the respondents genders, a Chi-Square test was performed. The test demonstrated X^2 (7, N = 139) = 5.18, p = .638. Since the p-value is greater than α = 0.05, it can be concluded that there is not enough evidence to suggest an association between genders, which means that the effect of gender is not significant.

A one-way ANOVA test was performed to determine if there were any significant differences between the ages of the respondents. It demonstrated that the effect of age is not significant (F(7, 131) = 0.382, p = .912).

Table 10

Descriptive statistics of the participants (N = 139)

	Condition								Total
	1	2	3	4	5	6	7	8	
Shape	warm	warm	cold	cold	warm	warm	cold	cold	
Colour	warm	warm	warm	warm	cold	cold	cold	cold	
Typography	warm	cold	warm	cold	warm	cold	warm	cold	
N	15	17	20	20	17	18	17	15	139
M	4.56	4.32	4.42	3.94	4.67	4.23	4.37	3.59	4.26
SD	1.00	1.10	1.12	0.96	1.18	1.11	0.99	1.10	1.12
Gender									
Female	12	11	14	11	10	14	12	12	96
Male	3	6	6	9	7	4	5	3	43
Age									
M	51.26	47.76	46.40	43.40	46.88	48.44	48.82	48.46	47.53
SD	16.86	10.14	14.12	15.41	14.02	16.26	13.89	18.46	14.75
Location (radius from Barendrecht)									
25km	12	14	15	13	14	15	16	11	110
50km	-	2	3	2	3	3	1	4	18
75km	2	1	1	2	-	-	-	-	6
100km	1	-	1	1	-	-	-	-	3
100km+	-	-	-	2	-	-	-	-	2

Note: *Response scale is 7-point Likert with 1 = strongly disagree to 7 = strongly agree.*

3.5.2 Procedure Online Experiment

The survey starts with informing the participants about the purpose of the survey, asking for their consent to use the collected data, and giving a short introduction. The first questions that are being asked are economic and demographic, such as where the company is situated, what type of company it is, and who the individual participant is (age, gender, nationality, and role in the company).

After collecting demographic data and obtaining consent from the participant, the main experiment in this study was conducted. The survey consisted of several questions to measure engagement, feelings of warmth, and social connectedness, as well as some control questions.

The eight experimental conditions were randomly assigned to the participants to ensure that any observed effects were due to the manipulation of the independent variables and not to individual differences. For the spread of the respondents over the conditions, see Table 10.

3.5.3 Stimulus Materials & Instruments

In the main experiment of the study, the stimulus materials used were mock-ups designed based on the manipulations of the design cues identified in the preliminary studies. The independent variables of the study were shape (hard opposed to soft shapes), typography (curved and legible opposed to square and illegible), and colour (warm opposed to cold colours). These independent variables were manipulated in the mock-ups to create eight experimental conditions. For this reason, eight mock-ups were created for the research (see Appendix 7). The dependent variables of the study were feelings of warmth and social connectedness, which were measured through self-report measures.

In addition, the stimulus materials for the main experiment are based on the branding of BU, including the logo and content of their website as mock-ups. This approach ensured

that the stimulus materials were contextually relevant to the participants and increased the external validity of the study.

Qualtrics, an online survey programme, is used to create and conduct the online experiment. Qualtrics randomly assigns respondents to the different conditions. The different mock-ups that have been created will be shown to the participants, and they will be asked questions about them.

3.6 Measures

3.6.1 Social Connectedness

Social connectedness was measured using a five-item construct using self-reporting. All of the used items for the construct can be found in Table 12.

The items of the construct are based on the items of the Social Connectedness Scale by Lee & Robbins (1995). The items were adjusted to fit the purpose of this study. Neither were all the items used, as they were not related to this study. The construct consists of statements that evaluate the feelings of respondents towards belongingness, social support, and social interactions.

The reliability of the social connectedness construct was good (a = .867).

3.6.2 Feelings of Warmth

A five-item construct was used to assess the perceived warmth of the respondents. Table 12 provides a summary of the items in the construct. The researcher created the objects in the construct.

The reliability of the construct was good (a = .863).

3.6.3 Engagement

Five items were for the construct of engagement. The construct's items are derived from O'Brien et al. (2018) User Engagement Scale (UES) and its abbreviated form. The items were modified to better suit the goals of the investigation. A summary is provided in Table 12. The reliability of this construct was high (a = .902).

3.6.4 Congruency

A five-item construct was created to assess the harmony and congruency between the visual hierarchy design cues. The Visual Aesthetics of Websites Inventory Scale (VisAWI) developed by Moshagen and Thielsch (2010), served as the basis for the items.

Shape, colour, and typography are measured simultaneously to evaluate the impact of the cues individually and collectively. Five items from the original VisAWI were picked for this research based on their usefulness for the purpose of this research. An overview of the used items can be found in Table 12. The reliability was good (a = .839).

3.7 Manipulation checks

To check whether the mock-ups were perceived as intended, a manipulation check was conducted.The control questions in the survey check whether design elements are perceived as warm or cold. This varies based on whether that element is warm or cold in the mock-up seen based on the experimental conditions. Therefore, both low and high scores can indicate that a mock-up is perceived as warm.

An overview of the questions can be found in Table 11.

Table 11

Overview of manipulation checks

Item	
1	The design is engaging
2	The design is attractive
3	The design is suitable with BU
4	The usage of colour gives me a warm/cold feeling
5	The shapes used in this design gives me a warm/cold feeling
6	The typography has a warm/cold appearance

Note: *Response scale is 7-point Likert with 1 = strongly disagree to 7 = strongly agree.*

3.8 Reliability

To assess the quality of the constructs and to evaluate internal consistency, a reliability analysis was conducted. To do this, Cronbach's alpha was used. A high Cronbach's alpha value indicates that the items on a scale are closely related. Table 12 provides an overview of the reliability analysis.

Table 12

Reliability analysis

Construct	Items	N	α
Social connectedness	I feel connected to the BU.	5	.867
	When I see the website, I experience a feeling of togetherness with BU.		
	I feel like I want to participate with BU.		
	I feel like I have a shared sense of purpose with BU.		
	I feel connected to society through BU.		
Feelings of warmth	I feel comfortable with the website of BU.	5	.863
	The website gives me a warm feeling.		
	I want to participate for BU.		
	I feel addressed by the website.		
	The company creates a positive and inviting atmosphere.		
Engagement	I feel like the website is interesting.	5	.902
	The website gives me a sense of involvement.		
	I feel like BU is worth it.		
	The website is inviting.		
	I feel like I want to engage more with the website.		

Note. Response scale ranges is a 7-point Likert scale with 1 = strongly disagree and 7 = strongly agree.

4. Results

This chapter elaborates on the results of the questionnaire. A MANOVA was conducted to investigate the effects of shape, colour, and typography on the combined dependent variables of social connectedness, feelings of warmth, and engagement. This section presents the main effects and interaction effects. The survey questions that were used can be found in Appendix 6.

4.1. Manipulation checks

To test the continuity of the impact of the visual manipulations on the users of the website, an independent t-test was conducted. To investigate the effects of shape, colour, and. This results in three statements that, depending on the condition, measure whether shape, colour, and typography are perceived as warm or cold. For example, "The colour usage of the website is warm." And "The colour usage of the website is cold.".

Although the main effect of shape was only marginally significant (t(137) = 3.43, p = .066), it seems to indicate that the round shape was perceived somewhat warmer (M = 4.26 SD = 1.07) than the angular shape (M = 4.17 SD = 1.20).

The main effect of colour was not significant (t(137) = 2.26, p = .135) This indicates that warm colours were not perceived as warmer (M = 4.37 SD = 1.13) than cold colours (M = 4.05 SD = 1.14). Although the manipulation check showed non-significant results for colour, we still proceed with the analyses as intended and reflect on this in the Discussion.

The main effect of typography was significant (t(137) = 12.81, p < .001) This indicates that legible and slightly rounded typographies were perceived as warmer (M = 4.43 SD = 1.12) than illegible square typographies (M = 3.99 SD = 0.90).

In Table 13 an overview of the multivariate tests on the combined dependent variables can be found.

Table 13

Overview of the multivariate tests.

	Wilks' Lambda	
Effect	**F**	**p**
Shape	.932	.060
Colour	.962	.293
Typography	.888	.004
Shape x colour	.901	.009
Shape x typography	.962	.292
Colour x typography	.955	.205
Shape x colour x typography	.992	.912

4.2 Social Connectedness

The multivariate test demonstrated that there were no significant main effects for shape and colour on social connectedness (see Table 14). There was a significant main effect of typography on social connectedness (F (1, 131) = 8.38, p = .004). This indicates that the mock-ups were perceived as more socially connecting when a warm typography was used (M = 4.26, SD = 1.03) than when a cold typography was used (M = 3.72, SD = 1.10). Based on this, H10 is supported.

A marginally significant effect was found of colour on social connectedness (F (1, 131) = 2.95, p = .088) this seems to indicate that the mock-ups using warm colours (red and yellow) were perceived as slightly warmer (M = 4.15, SD = 1.04) than mock-ups using cold colours (blue and green) (M = 3.83, SD = 1.08).

The univariate test demonstrated that there were no significant interaction effects of shape, colour, and typography on social connectedness. However, there was a marginally significant interaction effect of shape and colour on social connectedness. This suggests that when both warm shapes and colours were used the mock-ups were perceived as slightly warmer (M = 3.89, SD = 1.13) as opposed to cold shapes and colours (M = 3.78, SD = 1.03).

Table 14

Overview of the univariate tests.

Dependent variable	Independent variable	F	p
Social Connectedness	Shape	1.12	.292
	Colour	2.95	.088
	Typography	8.38	.004
	Shape x colour	2.86	.093
	Shape x typography	2.27	.134
	Colour x typography	.051	.822
	Shape x colour x typography	.165	.685

Table 15

Means and standard deviations of the main effects and interaction effects.

Dependent variable	Independent variable		*M*	*SD*
Social Connectedness	Shape x Colour x	Cold – cold – cold	3.43	1.18
	Typography	Cold – cold – warm	4.13	0.89
		Cold – warm – cold	3.94	0.97
		Cold – warm – warm	4.88	0.95
		warm – cold – cold	3.75	0.89
		warm – cold – warm	4.04	1.38
		warm – warm – cold	3.78	1.37
		warm – warm – warm	4.01	0.90
	Total		3.99	1.15

4.3 Feelings of warmth

There are no significant main effects or interaction effects of shape, colour, and typography on feelings of warmth. Despite there being no significant main effects, two marginally significant main effects were found. Typography has a marginally significant effect

on feelings of warmth (F (1, 131) = 3.74, p = .055) it seems to indicate that the mock-ups

using warm typography (legible, small, and curved) were perceived as somewhat warmer (M

= 4.40, SD = 1.10) than the cold typography (illegible, big, and angular) (M = 4.02 SD =

1.17).

Colour also has a marginally significant main effect on feelings of warmth (F (1, 131)

= 3.60, p = .060) it seems to indicate that the mock-ups using warm colours (red and yellow)

were perceived somewhat as warmer (M = 4.40 SD = 1.15) than the mock-ups using cold

colours (blue and green) (M = 4.03 SD = 1.22).

Table 16 provides an overview of the multivariate and univariate tests. Table 17

provides an overview of the means and standard deviations.

Table 16

Overview of the multivariate and univariate tests.

Dependent variable	Independent variable	F	p
Feelings of warmth	Shape	.238	.627
	Colour	3.60	.060
	Typography	3.74	.055
	Shape x colour	.79	.376
	Shape x typography	.152	.698
	Colour x typography	.004	.947
	Shape x colour x typography	.046	.831

Table 17

Means and standard deviations of the main effects and interaction effects.

Dependent variable	Independent variable		M	SD
Feelings of warmth	Shape x Colour x	Cold – cold – cold	3.64	1.08
	Typography	Cold – cold – warm	4.15	1.31
		Cold – warm – cold	4.24	1.09
		Cold – warm – warm	4.64	1.33

	warm – cold – cold	4.03	1.18
	warm – cold – warm	4.30	0.92
	warm – warm – cold	4.20	1.34
	warm – warm – warm	4.53	0.84
Total		4.22	1.59

4.4 Engagement

The multivariate test demonstrated that there were no significant main effects of shape or typography on engagement. However, there is a significant main effect of colour on engagement (F (1, 131) = 4.37, p = .039). As can be seen in Table 18.

This indicates that the mock-ups with warm colours are perceived as warmer (M = 4.29, SD = 1.25) than the mock-ups using cold colours (M = 3.89, SD = 1.21) as can be seen in Table 19.

A marginally significant main effect was found of typography on feelings of warmth (F (1, 131) = 3.74, p = .065) it seems to indicate that the mock-ups using warm typography (legible, small, and curved) were perceived as somewhat warmer (M = 4.24, SD = 1.10) than the cold typography (illegible, big, and angular) (M = 3.75 SD = 1.25).

The univariate test demonstrated that there were no significant interaction effects for shape, colour, and typography on engagement. Based on this, it can be said that H8 is supported.

Table 18

Overview of the multivariate and univariate tests.

Dependent variable	Independent variable	F	p
Engagement	Shape	1.19	.277
	Colour	4.37	.039
	Typography	3.47	.065

Shape x colour			.661	.418
Shape x typography			1.00	.318
Colour x typography			.254	.615
Shape x colour x typography			.076	.783

Table 19

Means and standard deviations of the main effects and interaction effects.

Dependent variable	Independent variable		*M*	*SD*
Engagement	Shape x Colour x	Cold – cold – cold	3.28	1.23
	Typography	Cold – cold – warm	4.04	1.22
		Cold – warm – cold	4.05	1.27
		Cold – warm – warm	4.49	1.41
		warm – cold – cold	3.70	1.13
		warm – cold – warm	4.27	1.12
		warm – warm – cold	3.95	1.35
		warm – warm – warm	4.17	0.95

4.5 Congruency

The multivariate test demonstrated that there was no significant main effect of shape on perceived congruency. There is a significant main effect of colour (F (1, 131) = 4.10, p = .045) on congruency effects with the other visual hierarchy design cues. This indicates that the usage of warm colours (M = 4.97, SD = 1.12) was perceived as more congruent with the other cues than the usage of cold colours (M =4.61, SD = 1.07).

There is also a significant main effect of typography (F (1, 131) = 9.54, p = .002) on congruency effects with the other visual hierarchy design cues. This indicates that the usage of warm (legible and curved) typography (M = 5.06, SD = 1.03) was perceived as more congruent with the other cues than the usage of cold (illegible and angular) typography (M = 4.52, SD = 1.12).

Two marginally significant interaction effects were found. Shape and colour have a marginally interaction effect on congruency (F (1, 131) = 3,25, p = .073). This may indicate that the mock-ups using both warm shapes and colours were found to be more congruent (M = 5.16, SD = 1.03) as opposed to the cold shapes and colours (M = 4.79, SD = 1.12). Additionally, an interaction effect of colour and typography was found on congruency F (1, 131) = 3,34, p = .070). This may indicate that the mock-ups using both warm colours and typography were found to be more congruent (M = 5.08, SD = 1.18) as opposed to the cold shapes and colours (M = 4.16, SD = 1.07).

Furthermore, to test hypothesis 10, it was tested when the mock-ups were congruent, and the website's attractiveness was higher. This means that conditions one and eight (congruent) were compared to the other conditions (incongruent). Based on this, H10 cannot be supported. However, comparing the congruency and attractivity outcomes shows that they are complimenting each other. This suggests that the congruency effect does influence attractiveness and H10 is supported. However, the congruency effect did not show as expected from previous research. This will be further discussed in Chapter 5.1.4 of the discussion.

An overview of the multivariate and univariate tests can be found in Table 20. An overview of the means and standard deviations of congruency and website attractiveness can be found in Table 21.

Table 20

Overview of the multivariate and univariate tests.

Dependent variable	Independent variable	F	p
Congruency	Shape	.040	.842
	Colour	4.10	.045
	Typography	9.54	.002
	Shape x colour	3.25	.073

Shape x typography			.973	.326
Colour x typography			3.34	.070
Shape x colour x typography			.024	.876

Table 21

Means and standard deviations

Dependent variable	Independent variable		*M*	*SD*
Congruency	Shape x Colour x	Cold – cold – cold	4.21	1.19
	Typography	Cold – cold – warm	5.30	0.76
		Cold – warm – cold	4.61	1.12
		Cold – warm – warm	4.98	1.28
		warm – cold – cold	4.13	1.00
		warm – cold – warm	4.81	0.94
		warm – warm – cold	5.12	1.00
		warm – warm – warm	5.20	1.09
Website attractiveness	Shape x Colour x	Cold – cold – cold	4.33	1.67
	Typography	Cold – cold – warm	4.82	1.18
		Cold – warm – cold	4.30	1.55
		Cold – warm – warm	3.40	1.60
		warm – cold – cold	4.47	1.58
		warm – cold – warm	4.17	1.75
		warm – warm – cold	4.18	1.66
		warm – warm – warm	4.10	1.84

4.6 Hypotheses results overview

Table 22 displays the hypotheses that were tested in this study and the extent to which they were supported by the results.

Table 22

Overview of results of hypotheses

Hypotheses		Result
H1	Soft and rounded shapes as opposed to hard and angular shapes will enhance a feeling of warmth.	Not supported
H2	Soft and rounded shapes as opposed to hard and angular shapes will enhance engagement.	Not supported
H3	Soft and rounded shapes as opposed to hard and angular shapes will enhance social connectedness.	Not supported
H4	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance a feeling of warmth.	Not supported
H5	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance engagement.	Not supported
H6	Warm typography (legible, curved, and small) as opposed to cold typography (illegible, angled, and large) will enhance social connectedness.	Supported
H7	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance a feeling of warmth.	Not supported
H8	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance engagement.	Supported
H9	Warm colours (red and yellow) as opposed to cold colours (blue and green) will enhance social connectedness.	Not supported
H10	Congruent visual hierarchy cues as opposed to incongruent visual hierarchy cues will create website attractiveness	Supported

5. Discussion & conclusion

This chapter discusses the main findings of this study. Next, theoretical and practical implications will be discussed, as will the limitations of the study. Lastly, recommendations for future research are investigated and discussed.

5.1 Discussion of the results

The aim of this study was to investigate how the use of visual hierarchy design cues (shape, colour, and typography) in UX design of a website can create a feeling of warmth and enhance engagement and social connectedness with a charity. The analyses showed that there is only a significant effect of typography on the UX of the website. However, there was a marginally significant effect found of shape of the UX of the website, aiming in the same direction as typography. This suggests that while shape, colour, and typography are not entirely significant, they may have a positive impact on the UX of a charity website. This indicates that there is a relationship that this study was not able to create.

Despite not all shape, colour, and typography showing an effect on their own, the analysis shows that website mock-ups with warm visual hierarchy cues are perceived as warmer, more engaging, and socially connecting. As well, website mock-ups with cold visual cues are perceived as colder, less engaging, and less socially connecting.

Further examinations support the idea that feelings of warmth positively influence social connectedness and engagement, and vice versa. In addition, when warmth is perceived, both social connectedness and engagement are also perceived. This outcome is in line with expectations and is consistent with previous research indicating that a feeling of warmth can enhance engagement (Hassenzahl, 2008 and 2010 & Fredricks et al., 2004). As well as enhance social connectedness, as a feeling of warmth is linked to pro-social behaviour (Hu et al., 2016) and social connectedness (Schnall et al., 2010). Engagement, social connectedness, and feelings of warmth are closely related and affect each other.

The association between feelings of warmth, engagement, and social connectivity indicates that embodiment and interpersonal interactions have a substantial impact on emotional reactions. According to embodiment, bodily experiences shape perception and emotion. Multi-sensory design including sight, touch, and sound may create embodied experiences that evoke emotional reactions. Moreover, interpersonal interactions highlight the influence of interaction on developing emotional experiences. Websites created for social causes may create a feeling of community and inclusion.

Although not all effects had a significant impact on the user experience (UX) of a website, a further analysis was conducted to explore the possibility of effects on the individual dependent variables of engagement, social connectedness, and feelings of warmth. No significant interaction effects were discovered among the independent variables of shape, colour, and typography on any of the dependent variables in the analyses that followed. However, some marginally significant interaction and main effects were found, as well as significant main effects.

5.1.1 Social connectedness

In regard to effects on social connectedness, typography alone was discovered to have a significant effect. Furthermore, a marginally significant main effect of colour and an interaction effect of shape and colour on social connectedness were found.

Respondents perceived the website mock-ups with warm typography as more socially connecting than mock-ups with cold typography. The analyses showed that typography seems to be more outstanding and conveys more meaning. Typography is just one component of text. Other factors include alignment, visual hierarchy, storytelling, readability, and emotional connotations. According to Tsonos & Κουρουπέτρογλου (2008), text can be something very emotional as it contains a tone of voice, information, and can convey meaning. The study primarily concentrated on the shape and size of the typeface.

Typography may be very personal, as it has the ability to evoke emotional reactions. Personal background and past experiences may influence this. Using a curved typeface in typography can provide a more personal feel, but the aesthetic appeal of the font does not

guarantee the text's overall pleasantness. This suggests that in order to feel more connected to a charity, people are reading the text to make a judgement. When a website clearly states what the charity is doing, who they are doing it for, and how you can help them, respondents are more likely to feel connected to the charity.

Additionally, a marginally significant effect of colour on social connectedness was found. Colour seems to influence how a user perceives a website and it impacts their sense of connection to a charity. This marginal effect is in line with previous research and the hypothesis. Yet the hypothesis is not supported due to the insignificant effect demonstrated in this study. Another marginal effect was found in the interaction between shape and colour on social connectedness. The marginal effect's presence indicates a potential impact, although it was not observed in this investigation.

The analysis suggests that shape does not influence the sense of connection to a charity. Whether a website uses rounded or square elements does not matter. This means that charities implementing more square shapes on their website can evoke a sense of trustworthiness and credibility (Vartanian et al., 2013).

Therefore, charity websites using warm typography and colour with cold shapes can be perceived as most socially connecting. This is also shown in the results of the experiment, as the mock-up using warm typography and colour and cold shape is perceived as the most connecting (M = 4.88) to indicate that shape has an effect of shape and colour on social connectedness weights as much as the effect of typography.

5.1.2 Feelings of warmth

There were no significant effects of shape, colour, or typography found on feelings of warmth. However, there were two marginal significant effects of colour and typography found on feelings of warmth. This seems to indicate that mock-ups using both warm colours and warm typography were perceived as warmer as opposed to the cold mock-ups. It is possible that colour and typography influence feelings of warmth, but that it did not show in this study.

It is possible that there is an embodied process present and that this study was unable to stimulate that through feelings of warmth. The neural activity for both physical and

psychological warmth occurs in the same part of the brain (Inagaki & Eisenberger, 2013). The website mock-ups were not using an association of physical warmth, which can explain the lack of an embodied process. This may indicate a disconnection between the respondents' embodied responses and the sensory stimuli. In digital environments, users interact with website content through a phone or computer screen. This limits physical interaction, unlike real-world interactions where touch, sound, and other sensory cues contribute to feelings of warmth. It is possible that visual clues alone may not be sufficient to evoke feelings of warmth. The lack of touch and physical sensations can reduce the integration of emotional and cognitive processing related to feelings of warmth.

Furthermore, there is an indication that colour can have an effect on feelings of warmth, this is in line with prior research. The specific context of charity websites might influence the impact of colour on warmth. Users might have pre-existing expectations about the colours typically associated with charities. Fluctuations from these anticipated outcomes have the potential to undermine the affective affinity towards the hue. Additionally, colour's impact may be diminished through interaction with other design elements. For instance, a warm colour paired with a playful font might evoke stronger feelings of warmth compared to the same colour used with a formal font.

5.1.3 Engagement

There were no effects of shape or typography on engagement; however, there was an effect of colour. It can be explained by the fact that colour has a big influence on how we interact with and perceive designs. The human eye is naturally drawn to things that stand out, such as headlines and blocks with a background colour (Everdell, 2014). Based on Gestalt principles (Chapman, 2018) it can also be said that obvious bright colours are the first things the human eye sees and wants to explore. Hassenzahl (2008 & 2010) argues that UX can influence a person's emotional response to a website. Which is one of the pillars of engagement based on the three-dimensional model of engagement (Fredricks et al., 2004).

The effect of colour was, however, not as big as expected. The goals and motivations of users for visiting charity websites might play a significant role in their level of engagement. Focusing only on the temperature impact of colour might overlook the importance of addressing user needs and motivations. Furthermore, the complexity of the website design can moderate the effect of colour on engagement. On websites with simpler layouts and fewer visual elements, colour might have a more pronounced effect.

Typography is found in the analyses to indicate a positive effect on engagement. However, the effect is not strong enough to validate the hypothesis. While typography can influence emotions and user experience, the impact on engagement might be indirect. Users might be more engaged by the content itself than only by typography. Therefore, having a certain goal to find information on a charity website can increase the effect of typography on engagement. As typography is more than just text size and shape.

5.1.4 Congruency

An effect of colour and typography was found on congruency. This means that when both colour and typography are warm, a higher congruency effect can be found. There is no general congruency effect found of warm shapes, warm colours, and warm typography. As shape does not influence congruency. This can be explained due to aesthetics, as hard angular shapes give a modern look to a website, which is a popular design trend.

A marginal effect of colour and typography, as well as shape and colour, was found on congruency. This seems to indicate that when colour and typography or shape and colour are both congruent, the website mock-up is perceived as warmer. Humans prefer stimuli that are easy to process and do not require much cognitive processing (Spence & Velasco, 2018). Therefore, when the stimuli are easy to understand and are congruent with each other, they can be perceived as better and, therefore, warmer. As congruency makes the processing of the design elements easier (Fenko & Van Rompay, 2018).

Based on this, it can be explained why shape does not influence congruency in this study. Looking at the outcomes of congruency, the mock-up perceived as most congruent is the mock-up using cold shapes and colours and warm typography. Cold square shapes

(Vartanian et al., 2013) and cold blue and green colours (Kuehni, 2012 & Wright, 1984) are generally associated with trustworthiness and credibility. This suggests that the mock-ups using cold shapes and colours and warm typography were in harmony with the expectations of the users of what a charity website should look like. Namely, a readable, warm typography in combination with a trustworthy website. And therefore, users might find trustworthiness of a charity website important.

Furthermore, when looking at the outcomes of both congruency and website attractiveness, it can be seen that when a website mock-up was perceived as congruent, it was also perceived as attractive. This emphasised the suggested effect of cold shape being more congruent, as it conveys trustworthiness and design aesthetics.

5.2 Research limitations

This research has a couple of limitations. The first one is the sampling method. The aim was to focus on mainly companies around Barendrecht; this turned out to be limiting as very few companies responded to the researcher. Therefore, the research area was broadened. However, this means that the BU might not be of influence to the respondents, and their thinking while answering the survey might be influenced by that.

An adjacent limitation of the sampling method is that the current way of collecting respondents is using the snowballing method. This violates the simple random sample condition for generalizable research. However, it did lead to a big unique variance in economic sectors and roles within a company. For example, there are respondents who are teachers, sales or marketing managers/employee's, bankers, politicians, healthcare workers from a varying spectrum (doctors, (physical) therapists, nurses, etc.), owners of stores, and self-employed people. In addition, some CEO's of different sectors responded such as a financial cooperation, education, construction, healthcare, and seafaring. It is safe to say a big variation of economic sectors was reached using the snowballing method of both the personal network of the researcher and BU.

Secondly, a testing limitation was present during the pretesting and focus group procedure. The first preliminary study was done with a small group of family members and friends within the personal network of the researcher. Findings from a small testing group may not generalize well leading to an higher chance of variability within the sample and less reliable results. In addition, it can limit the insights and external validity of the research findings.

During the preliminary tests it was found that the difference between the mock-ups was relatively small. In order to change this a focus group was held. During the focus group the respondents all gave the same answers despite answering the questions individually. The researcher should have collected more respondents for the focus group to broaden the responses. As the changes made in the mock-up designs still did not create much differentiation which might have led to a number of marginal significant results. If the mock-ups were perceived more as intended the marginally significant results could have been significant results, leading to more hypotheses being supported.

A third limitation of the research pertains to the distribution of demographic characteristics among respondents among the experimental conditions. Some conditions show significantly different percentages of respondents in terms of gender, job function, and sector the results of the research may be affected.

An adjacent limitation to the demographics of the respondents is that there were significantly more female respondents than male respondents. There are also certain job sectors that show significantly more respondents.

Furthermore, personal preference might play a role in this survey. Respondents may have subjective preferences for certain shapes, colours, or typography styles. Emotional responses were tested in this study, and these are very personal responses based on individual aesthetic tastes, cultural background, and past experiences. This can change the interpretation and evaluation of the sensory stimuli. Because of this, respondents might feel more positive emotions to certain visual hierarchy design elements. Furthermore, people are

more inclined to pay attention to stimuli that resonate with their personal preferences, as they find them appealing or correspond with their personal style.

A technical limitation was that a lot of people answered the survey on their phones through Qualtrics. Some respondents gave the researcher feedback that the images of the mock-ups were too small or pixelated. This was not possible to prevent through the Qualtrics system. It would have been better to create a mock-up of website for a phone not for desktop. This could have solved this issue.

5.3 Theoretical and practical implications

By examining how design elements interact with human emotions, this study not only enhances theoretical comprehension but also provides practical applications across diverse domains. The discussion delves into theoretical contributions, enriching design and psychological frameworks, while simultaneously exploring practical implications in areas such as branding, environmental design, education, and user experience.

5.3.1 Theoretical implications

The previously minimally explored relationship between design cues and emotional user perception in the context of charity website is explored in this research. By demonstrating the possible influence of shape, colour, and typography on feelings of warmth, social connectedness, and engagement this research offers insights into crating emotionally resonant and effective online experiences for the non-profit sector. A contribution to the theoretical understanding of UX visual hierarchy design elements in the non-profit sector is made.

Insights from psychology, design theory, and communication are used in this study. Therefore, this study builds a bridge between multiple disciplines. By synthesizing concepts from these diverse fields, the research enhances interdisciplinary dialogue and enriches the understanding of the complex dynamics between design aesthetics, user perceptions, and behavioural outcomes. The insights can help establishing a psychological framework for

design by using cognitive and emotional responses triggered by specific visual design elements. This can contribute to a better understanding of the relationship between design aesthetics, user perception, and psychological processes.

This study provides insights into how the presentation of visual elements can influence human emotional responses on website design. And therefore, builds upon the appraisal theory of emotions. By focussing on the specific context of charity websites a deeper understanding to the theory is added by highlighting the interaction between design elements, emotional responses, and appraisal processes.

Furthermore. understanding the effects of shape, colour, and typography on emotional perception can contribute to enriching design theory. The results show that only visual stimuli might not be enough to enhance warmth, engagement, and social connectedness through a charity website. This indicates that there is an embodied process present. Understanding that process can provide a deeper understanding and application of design theory by for instance, adding sounds and tactile elements to a website. Based on theory, it can assist designers in selecting design elements that stimulate the desired behaviour.

Lastly, the findings of this study may contribute to the construction of conceptual models that describe social interactions inside designed (social) environments, both in the digital and physical worlds. The observed relationships between design elements and emotional responses can be used to develop predictive models that anticipate how individuals might react and behave in different social contexts based on the design features of the environment. By understanding how specific design elements influence emotions and social connectedness behaviour can be strategically manipulated to encourage specific behaviours within a particular context. However, this has to be done in an ethical manner ensuring that positive social interactions and autonomy are promoted.

5.3.2 Practical implications

Designers can use the insights to optimise visual elements in their creations. Tailoring shape, colour, and typography to evoke desired emotional responses. Which can enhance the effectiveness of designed materials, whether in marketing, user interfaces, or physical spaces. Secondly, companies can strategically utilise the findings of this study to strengthen brand identity and communication. By aligning visual elements with the desired emotional and social associations, companies can create a more compelling and memorable brand presence.

In addition, the findings of this study can be applied in environmental design. Architects and urban planners can utilise the knowledge to impact the design of public areas. Visual features can influence the creation of environments that promote positive social interactions and community engagement.

Comprehending the impact of shape, colour, and typography on user emotions can result in designing interfaces that are not only functional but also offer a pleasant and captivating experience. Designers can create websites that inform, engage users, stimulate positive emotions, and strengthen relationships by using multi-sensory design principles, boosting interpersonal contact. This method can be especially beneficial for non-profit organisations and charities seeking to enhancing social connectedness and engagement with their donors.

This study can bridge the gap between theoretical knowledge and real implementations. Contributing to the areas of design, psychology, and social sciences combined. It can serve as a foundation for exploring and applying new design ideas that can impact human experiences in many digital and physical environments.

5.4 Recommendations for future research

This study examines the impact of design components on a website and their influence on users. A recommendation for future research is to incorporate various sensory

design elements beyond colour, typography, and shape. Additional factors including size, contrast, positioning, and alignment can further impact a user's experience. As well as offering a more sensory experience by adding sound and more embodied experiences. More research can be conducted to explore the impact of other sensory stimuli and how to create an even more engaging digital experience.

Adding to how multi-sensory designs affect UX on a website, further research can be done on how to make a website experience more embodied. As only visual stimuli might not be enough to persuade a user of a website into engaging with and investing time and effort in a charity. New insights can be found in exploring the (congruent) influence of senses of smell, sight, and sound on a pleasant user experience. Therefore, it can be researched how various senses can impact the user experience by using associations. For instance, an image of a hot beverage might trigger the brain to think about the smell of it and associate it the warm feeling it gives and connect positive feelings to the website.

A simple website design was used for the purposes of this research; nevertheless, interactive components and moving components are also possible in website design. Future research can focus on the movement and interaction of a website. Some movement and interaction might trigger a user to play around on the website and therefore be more likely to interact with a company. Excessive movement could potentially overstimulate and frustrate the user. It is crucial to find a balance in this.

Previous research on typography has mainly been focused on the textual readability of web content; this includes the development of readability metrics and formulas. In this, they look at the way a text is written and how understandable it is compared to the purpose of the website. However, not a lot of research has been done on the readability of the typeface. The results of this study show that cold typography was seen as illegible and warm typography was seen as legible. The focus on other factors such as size, angular vs. rounded, and shape was less evident. Therefore, it could be interesting to get a better understanding of what the physical factors of readability are and how they affect the connection between the user and the charity, brand, or company through a website.

In addition, exploring how typography elements, beyond the basics, such as readability, size, and style, may play a more crucial role in shaping emotional user responses on website can be interesting. As this study found that typography has the strongest effect on emotional website perception. This needs further exploration in order to create a theory on the contribution of specific typography features to emotional responses.

The effect of shape was weak in the analyses of this study. This can be explained by a number of things such as design trends, aesthetics, trustworthiness, and personal preferences. In this study it was evident that overall warm shapes did not have the expected effect and in the congruency effects it can be suggested that shape conveys a meaning of credibility and trustworthiness more than warmth. Future research can look into the effect of shape on a feeling of credibility, trustworthiness and design aesthetics on websites.

Corporate Social Responsibility (CSR) involves acknowledging and addressing the company's impact on society and the environment, with the aim of benefiting both. Consumers are more inclined to support companies that demonstrate social and environmental responsibility (Hsu & Hung, 2014). Companies involved in corporate social responsibility are more inclined to contribute to charity causes and promote their workers' involvement in charitable donations and volunteering (Jia & Zhang, 2015).

Future research can explore the relationship between companies engaging in CSR initiatives and their interactions with charities, non-profit organisations, and foundations. Additionally, research can be done on how engaging in Corporate Social Responsibility (CSR) activities can impact feelings of warmth, engagement, and social connectivity. Further research in this field is crucial for gaining a deeper understanding of the correlation between UX design, charity, and companies.

Understanding the influence of positive emotions linked to charitable giving on user engagement is crucial for the development of User Experience (UX) for charity websites. This can help UX designers create websites that are more empathetic and socially responsible. This could enhance the relationship among users, companies, and charities. Consequently, this can result in increased philanthropic contributions from corporations.

5.5 Conclusion

This study aimed to look into the impact of warm visual hierarchy design cues in UX design on users of a charity website. A conceptual discussion on the effect of shape, colour, and typography on feelings of warmth, engagement, and social connectedness is provided. This study used a 2 x 2 x 2 experimental research design to answer the research question: "*How can the use of visual hierarchy website design cues in UX design (colour, shape, and typography) create a feeling of warmth and enhance engagement with a charity?*".

The results support previous studies in UX design, indicating that warm shapes, colours, and typographies can influence feelings of warmth, engagement, and social connectedness. Although not all results are statistically significant, many suggest an influence in the expected direction based on the theoretical framework. Interestingly, the analysis revealed that the mock-up with cold shape, warm colours, and warm typography was seen as the warmest, most socially connecting, and most engaging. Trustworthiness and aesthetics appear to have a greater impact on the user experience of a website, since cold square shapes are perceived as more successful across all metrics.

This study demonstrates that colour and typography can evoke a sense of warmth, engagement, and social connectedness. Colour can convey meaning and help consumers distinguish between design elements. Typography involves physical aspects and the tone of voice of the text, making it a highly personal and emotional response. The impact of shape is less evident; this could be due to credibility, individual preferences, and the trend that simple, straight, and square designs are seen as modern more aesthetic.

Future research can look deeper into the effect of a multi-sensory embodied experience on website design and how it affects user behaviour for a charity. In combination with corporate socially responsible companies (CSR), as they are more inclined to show altruistic behaviour and participate in charitable giving.

In summary, this research contributed to the existing knowledge on UX design and charitable giving while shedding light on the ways in which users may be influenced by shape, colour, and typography elements of visual hierarchy design on a website.

6. References

Barsalou, L. W. (2008). Cognitive and Neural Contributions to Understanding the Conceptual

System. *Current Directions in Psychological Science*, *17*(2), 91–95.

https://doi.org/10.1111/j.1467-8721.2008.00555.x

Barsalou, L. W. (1999). Perceptions of perceptual symbols. *Behavioural and Brain Sciences*,

22(4), 637–660. https://doi.org/10.1017/s0140525x99532147

Caldwell, N. H., & Hibbert, S. A. (2002). The influence of web page text-background colour

combinations on retention of information. *Information Technology, Learning, and*

Performance Journal, 20(1), 1-14.

Cambridge Dictionary. (n.d.-a). *curiosity*. In *Cambridge Dictionary*. Retrieved on March 9th

2023, from https://dictionary.cambridge.org/dictionary/english/curiosity

Cambridge Dictionary. (n.d.-b). *engagement*. In *Cambridge Dictionary*. Retrieved on March

9th 2023, from https://dictionary.cambridge.org/dictionary/english/engagement

Cambridge Dictionary. (n.d.-c). *user experience*. In *Cambridge Dictionary*. Retrieved on

March 9th 2023, from https://dictionary.cambridge.org/dictionary/english/user-

experience

Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral

management of companyal stakeholders. *Business Horizons*, *34*(4), 39–

48. https://doi.org/10.1016/0007-6813(91)90005-g

Chapman, C. (2018, 27 march). *Exploring the Gestalt Principles of Design*. Toptal Design

Blog. https://www.toptal.com/designers/ui/gestalt-principles-of-design

Cavanaugh, L., Durrant, A., & McCrickard, D. S. (2017). Effects of font size on emotion and

attention. *Proceedings of the 2017 ACM Conference Companion Publication on*

Designing Interactive Systems, 77-80.

Cheng, C. K., & Tham, J. Y. (2017). Effects of typeface styles and font characteristics on

typographic differentiation, aesthetic preference and perceived personality. *Journal of*

Design Research, 15(1), 48-68.

Centraal Bureau voor de Statistiek. (2022, 18 oktober). *Steeds minder mensen doen vrijwilligerswerk*. Retrieved on march 13th 2023, via https://www.cbs.nl/nl-nl/nieuws/2022/42/steeds-minder-mensen-doen-vrijwilligerswerk

Choi, J., & Lee, J. (2017). The effect of colour on website emotions and attitudes: Moderating effects of involvement and website complexity. *Journal of Promotion Management*, 23(1), 36-55.

[Image of colour Wheel] (2013) *Create Visual Depth in Your Photographs with Colour*. Peachpit. Retrieved on 6th of April 2023, from https://www.peachpit.com/articles/article.aspx?p=2162084&seqNum=2

Coöperatie de Nederlandse Uitdaging. (2023, 9 januari). *Home - De Nederlandse Uitdaging*. De Nederlandse Uitdaging. Retrieved on 3rd of March 2023, from https://nluitdaging.nl/

Cuddy, A. J. C., Fiske, S. T., & Glick, P. (2008). Warmth and Competence as Universal Dimensions of Social Perception: The Stereotype Content Model and the BIAS Map. In *Advances in Experimental Social Psychology* (pp. 61–149). Elsevier BV. https://doi.org/10.1016/s0065-2601(07)00002-0

Dyson, M. C., & Haselgrove, M. (2001). The influence of reading speed and line length on the effectiveness of reading from screen. *International Journal of Human-Computer Studies*, 54(4), 585-612.

Dyson, M. C., Kipping, G. J., & Saini, P. (2008). Reading Information from Computer Displays. *ACM Computing Surveys*, 41(3), 1-29.

Everdell, I. (2014). Web Content. *Elsevier eBooks*, 163–186. https://doi.org/10.1016/b978-0-12-408138-3.00007-8

Farnè, A., & Làdavas, E. (2002). Auditory Peripersonal Space in Humans. *Journal of Cognitive Neuroscience,* 14(7), 1030–1043. https://doi.org/10.1162/089892902320474481

Fenko, A., & Van Rompay, T. J. L. (2018). Consumer-driven product design. In G. Ares & P. Varela (Eds.), *Methods in Consumer Research, Volume 2: Alternative Approaches*

and Special Applications (pp. 427– 462). Elsevier. doi:10.1016/B978-0-08-101743-2.00018-2

Francés, D. S., & Piqueras-Tomás, L. (2019). The effects of corporate social responsibility on consumer loyalty through consumer perceived value. *Ekonomska Istrazivanja-economic Research*, 32(1), 66–84. https://doi.org/10.1080/1331677x.2018.1547202

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School Engagement: Potential of the Concept, State of the Evidence. *Review of Educational Research,* 74(1), 59–109. https://doi.org/10.3102/00346543074001059

Gobert, F., & Buckley, J. (2000). The effects of typographic features on perceived information structure and the implications for multidocument hypertext navigation. *Behaviour & Information Technology*, 19(6), 385-396.

Harlow, H. F. (1958). The nature of love. *American Psychologist, 13*(12), 673–685. https://doi.org/10.1037/h0047884

Hassenzahl, M. (2011). User experience and experience design. ResearchGate. https://www.researchgate.net/publication/259823352_User_Experience_and_Experience_Design

Hassenzahl, M. (2010). Experience design: Technology for all the right reasons. Morgan Kaufmann.

Hassenzahl, M. (2008). User experience (UX): towards an experiential perspective on product quality. *Proceedings of the 20th international conference on Association Francophone d'Interaction Homme-Machine,* 11-15.

Hekkert, M. P., Suurs, R. A., Negro, S., Kuhlmann, S., & Smits, R. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological Forecasting and Social Change*, 74(4), 413–432. https://doi.org/10.1016/j.techfore.2006.03.002

Hogeveen, C. (2018, September 4) . Why Does Everyone Love Fall So Much?. *Science Actually Has Some Reasons*. Romper. Retrieved on 4th of august 2022, from

https://www.romper.com/p/why-does-everyone-love-fall-so-much-science-actually-has-some-reasons-11492650

Hsu, L. C., & Hung, W. H. (2014). The impact of philanthropic activities on consumer behaviour: An empirical study. *Journal of Consumer Marketing,* 31(1), 5-17.

Hu, T. Y., Li, J., Jia, H., & Xie, X. (2016). Helping Others, Warming Yourself: Altruistic Behaviours Increase Warmth Feelings of the Ambient Environment. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01349

Huang, W. H., Huang, Y. H., Tung, W. L., & Chen, C. H. (2016). The effect of font types on user experience and readability in mobile devices. *Applied Ergonomics,* 52, 291-297.

IJzerman, H., Coan, J. A., Wagemans, F. M. A., Missler, M. A., Beest, I. V., Lindenberg, S., & Tops, M. (2015). A theory of social thermoregulation in human primates. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.00464

Inagaki, T. K., & Eisenberger, N. I. (2013). Shared Neural Mechanisms Underlying Social Warmth and Physical Warmth. *Psychological Science,* 24(11), 2272–2280. https://doi.org/10.1177/0956797613492773

Inesi, M. E., Gruenfeld, D. H., & Galinsky, A. D. (2012). How power corrupts relationships: Cynical attributions for others' generous acts. *Journal of Experimental Social Psychology*, *48*(4), 795–803. https://doi.org/10.1016/j.jesp.2012.01.008

Jia, X., & Zhang, L. (2015). Corporate social responsibility, philanthropy, and corporate reputation: A Chinese perspective. *Journal of Business Ethics,* 126(2), 321-339.

Kang, J., & Hustvedt, G. (2013). Building Trust Between Consumers and Corporations: The Role of Consumer Perceptions of Transparency and Social Responsibility. *Journal of Business Ethics*, *125*(2), 253–265. https://doi.org/10.1007/s10551-013-1916-7

Kim, J., & Lee, K. W. (2019). Influence of integration on interactivity in social media luxury brand communities. *Journal of Business Research*, *99*, 422–429. https://doi.org/10.1016/j.jbusres.2017.10.001

Koo, M., & Fishbach, A. (2012). Warmth and competence: A content analysis of Chinese advertisements*. Journal of Cross-Cultural Psychology*, 43(3), 381-389.

Kuehni, R. G. (2012). *Colour: An Introduction to Practice and Principles* (3rd edition). John Wiley & Sons.

Landau, M. J., Meier, B. P., & Keefer, L. A. (2010). A metaphor-enriched social cognition. *Psychological Bulletin*, *136*(6), 1045–1067. https://doi.org/10.1037/a0020970

Lawless, H. (1991). Effects of Odors on Mood and Behaviour: Aromatherapy and Related Effects. *The Human Sense of Smell*, 361–386. https://doi.org/10.1007/978-3-642-76223-9_17

Lee, K., & Lee, S. (2010). The effect of website design elements on users' emotional responses. *Journal of Electronic Commerce Research,* 11(4), 237-249.

Lee, S., & Min, D. (2022). Sensory Stimuli to Sustainable Social Wellbeing: A Multimodal Approach Based on Warm Scent. *Behavioural Sciences*, *12*(5), 146. https://doi.org/10.3390/bs12050146

Lee, R. T., & Robbins, S. J. (1995). Measuring belongingness: The Social Connectedness and the Social Assurance scales. *Journal of Counseling Psychology*, *42*(2), 232–241. https://doi.org/10.1037/0022-0167.42.2.232

Lewis, D. (2021, 12th of august). Becoming content-driven Designers: Applying UX in print – spindogs. Spindogs. Retrieved on January 4th 2024 https://www.spindogs.co.uk/blog/becoming-content-driven-designers-applying-ux-in-print/

Lidwell, W., Holden, K., & Butler, J. (2010). Universal principles of design: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design. *Rockport Publishers.*

Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression!. *Behaviour & Information Technology,* 25(2), 115-126.

Liu, D., & Stasko, J. (2010). The role of visual aesthetics in user engagement with websites. *International Journal of Human-Computer Studies,* 68(8), 507-523.)

Lohse, G. L., & Hertel, G. (2010). Information visualization: Perception for design. *Elsevier.*

Mayer, R., Davis, J., & Schoorman, F. D. (1995). An Integrative Model of Companyal Trust. *Academy of Management Review, 20(3),* 709. https://doi.org/10.2307/258792

McManus, I. C., Humphrey, N. K., & Furnham, A. F. (1983). The perception of line orientations: Consensus and uniqueness. *Perception,* 12(3), 329-336.

Morris, S. R., & Akselsen, S. (2016). Type size and line spacing for readability: A review of the literature. *Visible Language,* 50(3), 149-179.

Moshagen, M., & Thielsch, M. T. (2010). Facets of visual aesthetics. *International Journal of Human-Computer Studies*, *68*(10), 689–709. https://doi.org/10.1016/j.ijhcs.2010.05.006

Müller, N., Burmester, M., & Wuest, H. (2011). Effects of display resolution, signal-to-noise ratio, and colour coding on saccade latencies during visual search on large displays. Displays, 32(4), 179-186.

Netherlands Enterprise Agency, RVO. (2024, 16 January). Corporate Social Responsibility (CSR). business.gov.nl. Retrieved on 3rd of march 2023, from https://business.gov.nl/regulation/corporate-social-responsibility/

Nielsen, J. (1993). Usability engineering. Elsevier.

Nielsen, J. (2006). F-shaped pattern for reading web content. *Nielsen Norman Group.*

O'Brien, H. L., Cairns, P., & Hall, M. (2018). A practical approach to measuring user engagement with the refined user engagement scale (UES) and new UES short form. International Journal of Human-Computer Studies, 112, 28–39.
https://doi.org/10.1016/j.ijhcs.2018.01.004

Obrist, M., Gatti, E., Maglio, P. P., & Heydarian, A. (2017). Multisensory experiences in HCI. *ACM Transactions on Computer-Human Interaction (*TOCHI), 24(5), 1-30.

Owie, E., Ademola, E. O. & Adams, D. (2017). Reality of Human Decision-Making: An Analysis. *Humanities, Management, Arts, Education & the Social Sciences Journal.* Vol. 5. No. 2, Pp 1-4.

Pierce, C., & Cheney, J. (2018). The effect of button colour and placement on user
interaction. Interna*tional Journal of Human-Computer Interaction,* 34(11), 1044-
1052.

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.
doi:10.1057/bm.2014.29

Schnall, S., Roper, J., & Fessler, D. M. T. (2010). Elevation Leads to Altruistic
Behaviour. *Psychological Science*, *21*(3), 315–
320. https://doi.org/10.1177/0956797609359882

Schubert, T. W. (2005). Your Highness: Vertical Positions as Perceptual Symbols of Power.
Journal of Personality and Social Psychology, *89*(1), 1–21.
https://doi.org/10.1037/0022-3514.89.1.1

Spence, C., & Velasco, C. (2018). On the multiple effects of packaging colour on consumer
behaviour and product experience in the 'food and beverage' and 'home and personal
care' categories. *Food Quality and Preference*, *68*, 226–237.
doi:10.1016/j.foodqual.2018.03.008

Stichting de Lokale Uitdaging. (2022, 6 september). *Home - Barendrechtse Uitdaging*.
Barendrechtse Uitdaging. Retrieved on 3rd of march 2023,
from https://barendrechtseuitdaging.nl/

Sonderegger, A., & Sauer, J. (2010). The influence of design aesthetics in usability testing:
Effects on user performance and perceived usability. *Applied Ergonomics*, 41(3), 403-
410.

Tsonos, D., & Κουρουπέτρογλου, Γ. (2008). A Methodology for the Extraction of Reader's
Emotional State Triggered from Text Typography. *In InTech eBooks.*
https://doi.org/10.5772/6071

Turvey, M. T. (1977). Preliminaries to a theory of action with reference to vision. *In
Perceiving, acting, and knowing* (pp. 211-265). Erlbaum.

Van der Meijden, M., & Schijven, M. (2002). The effects of webpage font size and typeface on readability, credibility and appeal. *Journal of Information Science,* 28(6), 469-479.

Vartanian, O., Navarrete, G., Chatterjee, A., Fich, L. B., Leder, H., Modroño, C., ... & Skov, M. (2013). Impact of contour on aesthetic judgments and approach-avoidance decisions in architecture. *Proceedings of the National Academy of Sciences,* 110(Supplement 2), 10446-10453.

Velasco, C., Obrist, M., & Spence, C. (2016). The role of context congruency in guiding multisensory attention. *In Proceedings of the 38th Annual Conference of the Cognitive Science Society*, 2193-2198.

Voorveld, H. A., Van der Goot, M., & Van der Hoorn, B. (2018). Using colour in online advertising: Emotion or cognition?. *Journal of Business Research*, 85, 220-228.

Williams, L. E., & Bargh, J. A. (2008). Experiencing Physical Warmth Promotes Interpersonal Warmth. *Science*, *322*(5901), 606–607. https://doi.org/10.1126/science.1162548

Wright, A. B. (2009). The Colour Affects System of Colour Psychology. *AIC colour congress*. https://doi.org/10.13140/2.1.4246.0489

7. Appendix

Appendix 1: *Wright Theory (1984) colour common descriptors*

Table 1

Wright Theory (1984) colour group 1 and 3 common descriptors

	Wright Theory colour names
Group 1 (morning light)	scarlet, watermelon, strawberry, peach, cream, coral, daffodil, apple green, emerald, aqua, sky blue, cobalt blue, bluebell, periwinkle, lilac, violet.
Group 3 (firelight)	vermilion, poppy, flame, ivory, burnt orange, russet, rust, chrysanthemum yellow, egg-yolk, saffron, olive green, forest green, leaf green, teal blue, petrel blue, aubergine.

Appendix 2: *Questionnaire preliminary study 1*

Preliminary study 1

Informed consent Welkom, Bedankt voor je deelname!

Ik volg de masterstudie communicatiewetenschappen aan de Universiteit van Twente.
Momenteel werk ik aan mijn master scriptie en doe ik onderzoek naar de invloed van visuele
elementen in een ontwerp. Om tot een zo goed mogelijk beeld te komen, voer ik een een
vooronderzoek uit. Het invullen van deze vragenlijst duurt ongeveer 5 minuten.
Er zijn geen goede of foute antwoorden.

Alle gegevens van deze enquête worden volledig anoniem verwerkt en worden alleen
gebruikt voor dit onderzoek. Je kan te allen tijde stoppen met het invullen van de vragenlijst
zonder hiervoor een reden op te geven.

Met vriendelijke groet,

Daphne Plaizier

Voor vragen of meer informatie kan je contact met mij opnemen via
d.l.plaizier@student.utwente.nl

Wil je meewerken aan dit onderzoek? Door ja te selecteren geef je aan bovenstaande informatie gelezen te hebben en vrijwillig meewerkt aan dit onderzoek.

○ Ja (1)

○ Nee (2)

Skip To: End of Survey If Wil je meewerken aan dit onderzoek? Door ja te selecteren geef je aan bovenstaande informatie gel... = Nee

End of Block: Intro

Start of Block: Kleur

Je krijgt een aantal kleuren te zien. Kijk er goed naar en zet ze in de juiste volgorde van warm naar koud.

Welke kleur vind jij het warmst?

Sleep de kleuren op volgorde van warm naar koud. 1 is het warmst, 6 is het koudst.

_____ Groen (1)

_____ Rood (2)

_____ Licht blauw (3)

_____ Oranje (4)

_____ Donker blauw (5)

_____ Geel (6)

End of Block: Kleur

Start of Block: Vorm

Je krijgt een aantal vormen te zien. Kijk er goed naar en zet ze in de juiste volgorde van welke je het vriendelijkst vind.

dichte vormen Welke vorm vind jij het meest vriendelijk? Sleep de kleuren op volgorde van vriendelijk naar onvriendelijk. 1 is het vriendelijkst, 6 is het onvriendelijkst.

_____ vorm 1 (1)

_____ vorm 2 (2)

_____ vorm 3 (3)

_____ vorm 4 (4)

_____ vorm 5 (5)

_____ vorm 6 (6)

End of Block: Vorm

Start of Block: Typografie

Q9 Welk lettertype vind jij het fijnst om te lezen? Sleep de lettertypes op volgorde van het fijnst naar het minst fijn. Waarbij 1 het fijnst is en 6 het minst fijn is.

_____ Lettertype 1 (1)

_____ Lettertype 2 (2)

_____ Lettertype 5 (3)

_____ Lettertype 3 (4)

_____ Lettertype 4 (5)

_____ Lettertype 6 (6)

End of Block: Typografie

Appendix 3: *Preliminary study 1 design cues*

Figure 1:

Colours selected for pre-test

Figure 2:

shapes selected for pre-test
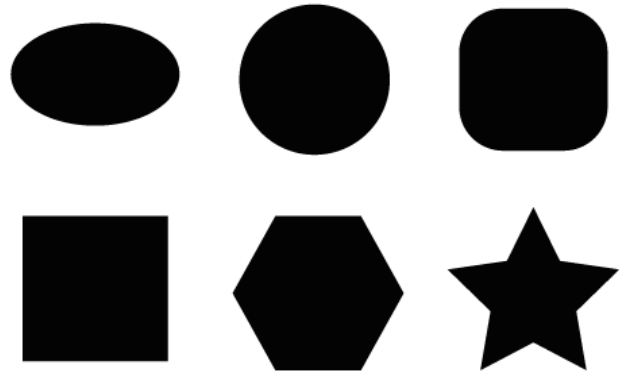
Figure 3:

Typographies selected for pre-test with names

MonteCarlo   1 style
Robert Leuschke

abcdefghijklmnopqrstuv

wxyz

Montserrat Alternates   18 styles
Julieta Ulanovsky, Sol Matas, Juan Pablo del Peral, Jacques Le
Bailly

a b c d e f g h i j k l m
n o p q r s t u v w x y
z

Xanh Mono   2 styles
Yellow Type, Lam Bao, Duy Dao

a b c d e f g h i j k
l m n o p q r s t u v
w x y z

Monda   2 styles
Vernon Adams

a b c d e f g h i j k l m n

o p q r s t u v w x y z

Tomorrow   18 styles
Tony de Marco, Monica Rizzolli

a b c d e f g h i j k l m n
o p q r s t u v w x y z

Share Tech Mono   1 style
Carrois Apostrophe

a b c d e f g h i j
k l m n o p q r s t
u v w x y z

Appendix 4: *Questionnaire preliminary study 2*

Preliminary Study 2

Welkom, Bedankt voor je deelname!

Ik volg de masterstudie communicatiewetenschappen aan de Universiteit van Twente.
Momenteel werk ik aan mijn master scriptie en doe ik onderzoek naar de invloed van visuele
elementen in een ontwerp. Om tot een zo goed mogelijk beeld te komen, voer ik een
vooronderzoek uit. Het invullen van deze vragenlijst duurt ongeveer 5 minuten.
Er zijn geen goede of foute antwoorden.

Alle gegevens van deze enquête worden volledig anoniem verwerkt en worden alleen
gebruikt voor dit onderzoek. Je kan ten allen tijde stoppen met het invullen van de vragenlijst
zonder hiervoor een reden op te geven.

Met vriendelijke groet,
Daphne Plaizier
Voor vragen of meer informatie kan je contact met mij opnemen via
d.l.plaizier@student.utwente.nl

Wil je meewerken aan dit onderzoek? Door ja te selecteren geef je aan bovenstaande informatie gelezen te hebben en vrijwillig meewerkt aan dit onderzoek.

○ Ja

○ Nee

Wat is je gender?

○ Man

○ Vrouw

○ Non-binair

○ Anders... _____

○ Wil ik liever niet zeggen

Wat is je leeftijd?

Sleep de balk naar de juiste leeftijd.

0   10   20   30   40   50   60   70   80   90   100

Mijn leeftijd is...

In dit onderdeel van de enquête krijg je acht verschillende afbeeldingen te zien van een website. Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden bij deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

End of Block: Mock-up 1

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden met deze website	○	○	○	○	○	○	○
Ik vind deze website prettig	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden met deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

End of Block: Mock-up 2

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij verbonden met deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

End of Block: Mock-up 3

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	◯	◯	◯	◯	◯	◯	◯
Ik voel mij vebonden met deze organisatie	◯	◯	◯	◯	◯	◯	◯
Ik vind het een prettige organisatie	◯	◯	◯	◯	◯	◯	◯
Ik vind het ontwerp van de website passen bij de organisatie	◯	◯	◯	◯	◯	◯	◯

End of Block: Mock-up 4

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	◯	◯	◯	◯	◯	◯	◯
Ik voel mij vebonden met deze organisatie	◯	◯	◯	◯	◯	◯	◯
Ik vind het een prettige organisatie	◯	◯	◯	◯	◯	◯	◯
Ik vind het ontwerp van de website passen bij de organisatie	◯	◯	◯	◯	◯	◯	◯

End of Block: Mock-up 6

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

End of Block: Mock-up 7

In dit onderdeel van de enquête krijg je verschillende afbeeldingen te zien van een website.

Kijk goed naar de afbeelding voor je de vragen beantwoord die bij de afbeelding horen.

Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan.

De vragen gaan over de website.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze website ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze website	○	○	○	○	○	○	○
Ik vind het een prettige website	○	○	○	○	○	○	○
Ik vind deze website aantrekkelijk	○	○	○	○	○	○	○

Kijk nog een keer naar de afbeelding van de website. Geef aan of je het eens of oneens bent met de stellingen die hieronder beschreven staan. De vragen gaan over de organisatie.

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Deze organisatie ervaar ik als warm	○	○	○	○	○	○	○
Ik voel mij vebonden met deze organisatie	○	○	○	○	○	○	○
Ik vind het een prettige organisatie	○	○	○	○	○	○	○
Ik vind het ontwerp van de website passen bij de organisatie	○	○	○	○	○	○	○

End of Block: Mock-up 8

Appendix 5: *Mock-ups preliminary study 2*

Figure 4: Mock-up 1

Figure 5: Mock-up 2

Figure 6: Mock-up 3

Figure 7: Mock-up 4

Figure 8: Mock-up 5

Figure 9: Mock-up 6

Figure 10: Mock-up 7

Figure 11: Mock-up 8

Appendix 6: *Questionnaire main study*

Welkom, Dank u wel voor uw deelname.

In het kader van mijn masteropleiding Communication Science aan de Universiteit van Twente doe ik onderzoek naar de invloed van visuele elementen in een website-ontwerp. Het invullen van deze vragenlijst duurt ongeveer 10 minuten. Er zijn geen goede of foute antwoorden.

Alle gegevens van deze enquête worden volledig anoniem verwerkt en worden alleen gebruikt voor dit onderzoek. U kunt ten allen tijde stoppen met het invullen van de vragenlijst zonder hiervoor een reden op te geven.

Met vriendelijke groet,

Daphne Plaizier

Voor vragen of meer informatie kan je contact met mij opnemen via

d.l.plaizier@student.utwente.nl

Wilt u meewerken aan dit onderzoek? Door ja te selecteren geeft u aan bovenstaande informatie gelezen te hebben en vrijwillig meewerkt aan dit onderzoek.

○ Ja (1)

○ Nee (2)

Skip To: End of Survey If Wilt u meewerken aan dit onderzoek? Door ja te selecteren geeft u aan bovenstaande informatie gel... = Nee

End of Block: Intro

Start of Block: Demographic and economic questions

Wat is uw gender?

○ Man (1)

○ Vrouw (2)

○ Non-binair (3)

○ Anders... (4) _____

○ Wil ik liever niet zeggen (5)

Wat is uw leeftijd?

 Sleep de balk naar de juiste leeftijd.

	0 10 20 30 40 50 60 70 80 90 100
Mijn leeftijd is... ()	⬤

Skip To: End of Survey If Wilt u meewerken aan dit onderzoek? Door ja te selecteren geeft u aan bovenstaande informatie gel... = Nee

Wat is uw nationaliteit?

_____

Wat is uw woonplaats?

_____

Page Break

De volgende vragen gaan over het bedrijf waar u voor werkt.

In welke sector bevindt het bedrijf waar u voor werkt zich? Of het laatste bedrijf waar u voor gewerkt heeft.

○ Industrie (1)

○ Bouwnijverheid (2)

○ Landbouw/ bosbouw (3)

○ Waterbedrijven en afvalbeheer (4)

○ Energievoorzieningen (5)

○ Zakelijke dienstverlening (6)

○ Handel (7)

○ Horeca (8)

○ Cultuur, sport en recreatie (9)

○ Vervoer en opslag (10)

○ Informatie en communicatie (11)

○ Verhuur en handel van onroerend goed (12)

○ Gezondheids- en welzijnszorg (13)

○ Onderwijs (14)

○ Openbaar bestuur en overheidsdiensten (15)

◯ Anders, namelijk... (16)

_____

In welke plaats bevindt het bedrijf waar u voor werkt zich? Of het laatste bedrijf waar u voor gewerkt heeft.

_____

Wat uw jouw functie binnen het bedrijf? Of uw functie bij laatste bedrijf waar u voor gewerkt heeft.

_____

End of Block: Demographic and economic questions

Start of Block: Mock-up

In dit onderdeel van de enquête krijgt u een afbeelding te zien van een website. Het gaat om de website van de Barendrechtse Uitdaging. Kijk goed naar de afbeelding en beantwoord de vragen.

De Barendrechtse Uitdaging is een stichting die het bedrijfsleven matchet met

maatschappelijke organisaties. Stichtingen en verenigingen hebben vaak mooie ideeën, maar de uitvoering komt niet altijd van de grond. De Barendrechtse Uitdaging voorziet deze organisaties van menskracht, materiaal en middelen uit het bedrijfsleven. Denk hierbij aan hout voor een werkplaats voor een dagbesteding. Of in het voorzien van materiële behoeftes zoals meubels, gereedschap, oven en laptops etc. die in het bedrijfsleven overbodig zijn geworden.

Page Break

Kijk goed naar de afbeelding en beantwoord de vragen.

(afbeelding website mock-up)

	Helemaal mee oneens (1)	Oneens (2)	Beetje mee oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik voel mij verbonden met de Barendrechtse Uitdaging. (1)	○	○	○	○	○	○	○
Als ik de website zie, dan ervaar ik een gevoel van saamhorigheid. (2)	○	○	○	○	○	○	○
Ik heb het gevoel dat ik mee wil doen. (3)	○	○	○	○	○	○	○
Ik heb het gevoel dat ik een gedeeld doel heb met de Barendrechtse Uitdaging. (4)	○	○	○	○	○	○	○

	Helemaal mee oneens (1)	Oneens (2)	Beetje mee oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik voel mij verbonden met de samenleving door de Barendrechtse Uitdaging. (5)	○	○	○	○	○	○	○

- -

Page Break ───────────────────────────────────

Kijk goed naar de afbeelding en beantwoord de vragen.

(afbeelding website mock-up)

- -

Beantwoord de vragen

	Helemaal mee oneens (1)	Oneens (2)	Beetje mee oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik voel mij comfortabel bij de website van de	○	○	○	○	○	○	○

Barendrechtse Uitdaging. (1)							
Ik krijg een warm gevoel van de website. (2)	○	○	○	○	○	○	○
Ik wil bijdragen aan de Barendrechtse Uitdaging. (3)	○	○	○	○	○	○	○
Ik voel mij aangesproken door de Barendrechtse Uitdaging. (4)	○	○	○	○	○	○	○
De website creëert een positieve en uitnodigende sfeer. (5)	○	○	○	○	○	○	○

Page Break

Kijk goed naar de afbeelding en beantwoord de vragen.

(afbeelding website mock-up)

Beantwoord de vragen

	Helemaal mee oneens (1)	Oneens (2)	Beetje mee oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik vind de website interessant. (1)	○	○	○	○	○	○	○
De website geeft mij een gevoel van betrokkenheid. (2)	○	○	○	○	○	○	○
Ik heb het gevoel dat de Barendrechtse Uitdaging de moeite waard is. (3)	○	○	○	○	○	○	○
Ik vind de website uitnodigend. (4)	○	○	○	○	○	○	○
Ik wil de website blijven gebruiken. (5)	○	○	○	○	○	○	○

Kijk goed naar de afbeelding en beantwoord de vragen.

(afbeelding website mock-up)

	Helemaal mee oneens (1)	Oneens (2)	Beetje mee oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
De elementen op deze website passen goed bij elkaar. (1)	○	○	○	○	○	○	○
De lay-out van de website ziet er goed gestructureerd uit. (2)	○	○	○	○	○	○	○
De lay-out van de website is gemakkelijk te begrijpen. (3)	○	○	○	○	○	○	○
De website is met zorg ontworpen. (4)	○	○	○	○	○	○	○

| Op deze website komt alles samen. (5) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

.

Page Break

Kijk goed naar de afbeelding en beantwoord de vragen.

(afbeelding website mock-up)

Beantwoord de vragen

	Helemaal mee oneens	Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Mee eens	Helemaal mee eens
Het ontwerp is aansprekend. (1)	○	○	○	○	○	○	○
Het ontwerp is aantrekkelijk. (2)	○	○	○	○	○	○	○
Het ontwerp is passend bij de Barendrechtse Uitdaging. (3)	○	○	○	○	○	○	○
Het kleurgebruik van deze website is warm. (4)	○	○	○	○	○	○	○
De vormen van deze website hebben een warme uitstraling. (5)	○	○	○	○	○	○	○
Het lettertype heeft een warme uitstraling. (6)	○	○	○	○	○	○	○

End of Block: Mock-up

Bedankt voor uw deelname! Er zal zorgvuldig omgegaan worden met uw antwoorden.

Bedankt voor uw deelname! Er zal zorgvuldig omgegaan worden met uw antwoorden.

Appendix 7: *Mock-ups main study*

Figure 11: Mock-up 1

Figure 12: Mock-up 2

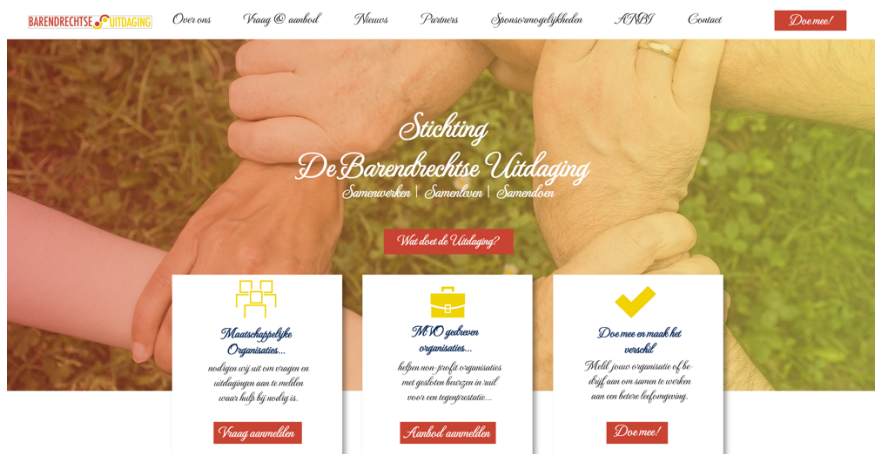
Figure 13: Mock-up 3

Figure 14: Mock-up 4

Figure 15: Mock-up 5

Figure 16: Mock-up 6

Figure 17: Mock-up 7

Figure 18: Mock-up 8