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Abstract

Internet retailers use different online presentation methods to provide detailed product-oriented information. In this way, communicating the materials of products is difficult but necessary for online retailing. Consumer cannot directly touch and feel the products, which may lead to disappointment, as the material of the product they ordered may differ from what they thought based on the online information. Internet retailers need to choose suitable solutions for presenting their products online, which is influenced by various and multi-dimensional factors. Therefore, getting a systematic understanding, which is about advantages and disadvantages of different methods for presenting certain products in order to get a correct impression about the material of products on a website, is really necessary for the companies with online retailing demands.

With those considerations, a research starts from the field of online clothing shopping in order to study and deepen the understanding of popularly used presentation methods on webpages for better communicating the materials of products. After studying of the related researches and 19 popular clothing shopping websites in Europe and China, an experiment with 90 female participants and 12 interviews are conducted to investigate the influences of 5 different combinations of online product presentation methods on consumers' perception accuracy of product material.

The quantitative results from the experiment and the insights from the interviews are analyzed and discussed. According to the quantitative results, the studied 5 dresses have significant impacts on the perception accuracy. Moreover, combining the experiment results with the insights from the interviews, the discussion indicates that the fabric features of different dresses are the main reasons for the influences on the perception accuracy. From the presentation method perspective, no solid results could statistically indicate that the different combinations of online product methods have influences on the perception accuracy. The advantages and disadvantages of different presentation methods for presenting clothing fabric are compared and discussed, which comes up with a guideline for helping the company to present their products online. Lots of insights and inspirations are obtained from the discussion about the reasons for the perception differences, which could be further explored.

Keywords: online presentation method, online material communication, material perception, online shopping, online clothing shopping.

1. Introduction

Online retailing has been one of the fastest growing retail sales channels. US retail e-commerce sales reached 2.3 trillion US dollars in 2017 and e-retail revenues are projected to grow to 4.88 trillion US dollars in 2021 (Statista, 2017). Among many product categories sold online, apparel is a major purchase category (Murphy, 2000). Until 2018 summer, worldwide revenue and revenue per user of apparel and accessories are 317 billion US dollars and 270 US dollars per person, and they both projected to grow, with expectations of reaching 475 billion US dollars and 301 US dollars per person (Enterprise E-commerce Blog, 2018).

In an online environment, online product presentations are designed to introduce products to consumers, in order to help consumers to build a clear understanding of the products, and to impress consumers with superior or attractive product features (Hoch & Deighton, 1989).

The role of online product presentation is becoming even more vital for products such as apparel that involve sensory experience as part of the consumer decision-making process (Kim & Lennon, 2008; Yoo & Kim, 2012).

Online apparel shopping is associated with high levels of perceived risk (Choi & Lee, 2003) since consumers could not directly access and try on the products when shopping online. Based on the study of exploring and analyzing online returning behavior in the context of fashion merchandise (Saarijarvi, 2017), the disconfirmation-driven and feeling-driven returning behaviors are most relevant with the product material perceptions of customers. More specifically, the disconfirmation-driven returning behaviors are directly caused by unexpected materials and misleading product descriptions or images. After consumers have received the product, they might feel that it is not the customer's style or just that it is not right, which could also be related to the wrong perception of product materials. Logically, the perception of product materials is the most serious issue because all the physical tactile information is lacking, and it could only be compensated by product presentations.

In this situation, apparel Internet retailers use different online presentation methods, which are capable of providing detailed product-oriented information and, thereby, mitigating the lack of "touch and feel", which, in turn, is expected to give online shoppers a correct impression about product materials. This will lead to fewer returns and more satisfied shoppers.

On the other hand, over two-thirds of online shoppers prefer offline stores for apparel purchases comparing with online stores (PwC, 2018). This suggests that current online product presentations, even those that utilize a variety of visualization technologies, may not be effective in facilitating the tactile experience.

Therefore, more attention should be focused on how online product presentation methods communicate product materials with consumers, which is highly related to tactile experience.

However, not so much research has been done on comparing and evaluating different methods of online apparel presentation, which are popular in the recent apparel online retailing websites, in order to get correct perceptions of product materials.

Above else, this research focuses on helping online apparel retailers to get a systematic understanding, involving the advantages and disadvantages of different methods for presenting certain products in order to get a correct impression of product materials to lower the return rate.

To answer the research questions, the essence of communication between online product presentations and online shoppers should be clarified in terms of apparel products.

1.1 Visual and tactile perception of material in online shopping environment

Online shopping environments are characterized by the lack of physical interaction between people and products. In fact, one key deterrent with online shopping is the impossibility of physically examining products on the computer screen (Cho, Kang & Cheon, 2006; Lee & Park, 2014; Overmars & Poels, 2015). When touching is not possible, imagination plays a key role in purchasing decisions (Peck, Barger & Webb, 2013). On the Internet, consumers need to be able to easily imagine how the product would be and feel in order to create an accurate impression and consider its purchase (Argyriou, 2012; Schlosser, 2003).

From the material perception perspective, visual perception of material is directly related with an imagination of online apparel shopping. Material perception is concerned with how we perceive what things are made of (Anderson, 2011). In general, without actually touching an object, we usually have a clear idea of what it would feel like after seeing it. Even with unfamiliar materials, we seem to be acutely aware of their specific visual and physical characteristics. In other words, in addition to recognizing and categorizing materials, we also form a vivid impression of their material properties. Consequently, humans appear to derive a compelling sense of material properties through vision.

Based on the review work, "color and material perception: Achievements and challenges", of Brainard and Maloney in 2010, the visual perception of material properties mainly based on lightness and color, translucency, gloss and shape of the reviewed item. And the scene illumination plays an important role in material perception.

On the other hand, tactile perception refers to every type of sensation related to the sense of touch, be it cutaneous (pressure, vibration, temperature), kinesthetic (limb movement) or proprioceptive (position of the body) (Loomis & Lederman, 1986). The tactile sense provides us with a number of aspects related to an object's material, most notably roughness, compliance, coldness and slipperiness. In an online shopping environment, tactile information of product materials has to be provided by consumers' imaginations. In the other words, most of information has to be perceived from the visual perception.

Therefore, the visual perception plays a dominant role on material perception in the online shopping environment of apparel product.

From the information perspective with visual perception, most online shopping websites employ text and pictures to present product information (Lightner and Eastman, 2002), which is an efficient and economical way of dealing with online product presentation. The text is normally used to describe search attributes (Nelson, 1974), such as product size, weight, and warranty policies; while pictures are used to depict the visual appeal of products, which is usually difficult to describe with verbal cues alone (Baggett, 1989). This general function differentiation still works nowadays.

On the other hand, textual information was also proved to have influences on material perceptions. Comprehending implied tactile properties when reading can alter real-world tactile perceptions (Brunye et al., 2012). This is a particularly compelling proof that reading textual information appears to prime tactile mental representations and these activations influence subsequent direct perception. In the research, website design identifies product information content as a key success factor, the study indicates that information content affects the perceptions and behavior of online consumers. Logically, the textual information presentation also influences the user's understanding of presented products. According to the research of Blanco et al in 2017, when a picture of the product appears together with textual information,

users remember more information and consider it easier to remember if that information appears schematically.

However, Nelson (1974) pointed out that text and static pictures are insufficient for presenting rich product information, particularly for experience attributes, such as the feel, trying on, and touching aspects of a product. Therefore, the inherent limitation of the online product presentation to present comprehensive product information probably leads to customers being less knowledgeable about the products that are interesting to them and less informed when making their purchase decisions. Consequently, multiple new methods for presenting product information are being developed in order to optimize this situation.

1.1 Online product presentation

1.1.1 Online product presentation of photography

From the photography perspective, prior research findings suggest that using imagery or vivid information stimuli is particularly desirable when services or products are highly intangible (Song & Kim ,2012). In line with the need for vivid stimuli to help people build a better understanding of the product, MacInnis and Price (1987) found that product presentation, such as large picture, facilitates imagery processing than a small picture. A large picture attracts more attention to the product and stimulates more consumption imagery than a small picture (Percy & Rossiter, 1983). Similarly, a large picture is posited to help people build a better understanding of the product.

According to the study (Song & Kim, 2012), which examines how online shopping perception risks can be reduced specifically by using a more effective online product presentation method, both the picture size and the number of product views have a significant effect on mental intangibility. And, the findings of research also suggest that using a combination of both product presentations, which are using big pictures and multiple product views, is an effective method for increasing mental tangibility. This study used the handbag in the experiment. Mental intangibility reflects how much information one perceives to grasp (McDougall & Snetsinger, 1990), and it is necessary to alleviate the perception of risk in online shopping (Laroche et al.,2014). These results are consistent with past findings that product presentation helps consumers to make more informed decisions (Kim & Lennon 2008).

1.1.2 Online product presentation of videos

With the aim of helping consumers to cope with the lack of physical contact with products, online retailers have developed rich virtual product experiences to mimic reality (Walia, Srite & Huddleston, 2016). E-commerce research has mainly focused on the dimensions of interactivity and vividness of the online product presentation to determine its effectiveness on consumers (e.g., ComScore, 2015; Jiang & Benbasat, 2007; Klein, 2003; Li, Daugherty & Biocca, 2002 & 2003; Li & Meshkova, 2013). Empirical evidence demonstrates that vividness is more effective than interactivity in influencing consumers' product knowledge and attitudes (Coyle & Thorson, 2001; Jiang & Benbasat, 2007). And, sophisticated interactive tools may be costly for both the company and the consumer because of the learning required to manage them or the increased download time (Fortin & Dholakia, 2005); other authors question the honesty of interactive virtual product experiences to represent real experiences with a product (Xiao & Benbasat, 2011).

In this way, product videos have a certain level of interactivity (Li & Meshkova, 2013) and posse a high capacity to present the product vividly (Jiang & Benbasat, 2007). Online Product

Presentation Videos (OPPVs henceforth) are audio-visual content showing product characteristics and are used to introduce products to consumers. OPPVs can be found at a high variety of Internet sites, such as landing pages, brand's official websites, e-retailers, online social networks or popular broadcasting platforms. Manufacturers, e-retailers, independent expert sources, online consumers, and users generally share online videos in order to offer product knowledge from different perspectives (Li & Meshkova, 2013; ComScore, 2015; Chiang & Hsiao, 2015; EMarketer, 2014; Ertimur & Gilly, 2012; Lian, 2011). According to the research (Orús & Flavián, 2017), the findings of the two experimental studies reveal that a factual OPPV improves the quality of the consumers' product-related thoughts about the product and facilitate their imaginations.

1.1.3 Online product presentation of virtual product exeriences

Although vividness is more effective than interactivity in influencing consumers' product knowledge and attitudes (Coyle & Thorson, 2001; Jiang & Benbasat, 2007), the interactivity is also influential in the online product presentation.

Comparing with OPPVs, virtual product experiences (VPE) is mainly relevant to the Interactivity, which is defined as web shopping experiences that allow consumers to interact with and try products through web interfaces. Interactivity is an essential e-marketing design element (Yoo et al., 2014) that provides users with both hedonic and utilitarian experience through providing entertainment (Kim and Forsythe, 2010) whilst simultaneously saving time and effort (Broekhuizen and Huizingh, 2009) for the user.

VPE has been compared with other online product presentations in terms of effectiveness (Jiang & Benbasat, 2007), and the research also indicates that videos can largely perform as well as VPE in terms of both perceived and actual understanding of product attributes. In this research, the effectiveness of four types of online product presentation methods has been examined. These four types of online product presentation methods are static-picture, the video-without-narration, the video-with-narration, and the VPE, and those are applied widely in online shopping websites. The static-picture method presents product information on a website through static images combined with the relevant explanatory text or hypertext descriptions. The two video methods present product information on a website by continuously playing video demonstrations, which includes dynamic visual stimuli such as the multiple product images and corresponding product sound effects, such as a watch's alarm. These two methods differ in that the video-without-narration condition uses text descriptions to explain product features, while detailed text explanations are narrated aloud in connection with the video in the video-with narration condition. The VPE method presents product information by allowing consumers to interact with a product simulator and sample product features as they can do in the direct product experience. Two major dependent variables, actual product knowledge and perceived website information, have been used to measure consumers' product understanding performance from two perspectives: actual and perceived. This experiment shows that (1) Online presentation strategies such as video-without-narration and virtual product experiences are more effective than static pictures and video-with-narration in influencing consumer experiences in terms of interactivity and vividness. (2) Videos are generally more effective than static pictures to depict products in order to help consumers understand products (except for highly complex tasks) and help them build positive perceptions. (3) Videos can largely perform as well as VPE in terms of both perceived and actual understanding.

1.2 Review summary

Based on the above review of online product presentation methods, in terms of photography, text, video and VPE, a lot of studies have been done in this field. However, even basic research that is related with apparel material perception in online retailing environment has not been done. On the other hand, the visual perception plays a dominant role on material perception in the online shopping environment of apparel product. According to the study of Jiang and Benbasat (2007), videos can largely perform as well as VPE in terms of both perceived and actual understanding of product attributes. And, comparing with video, virtual product VPE is mainly relevant to the Interactivity, which is not directly under the scope of visual perception. In this way, the focus of the research on presentation methods should be visual-based, in terms of photo, video and textual information.

The next section starts with the theoretical basis and the conducted research of the experiment design in order to develop the hypotheses. After that, an experiment is designed and conducted to test the hypotheses.

2. Hypotheses formulation and justification

To research on the question of getting a systematic understanding of different online apparel presentation methods for having a correct impression of product materials, the online visual merchandising of apparel websites and the theoretical foundation of online product presentation have been studied.

The study of online visual merchandising of apparel websites contributes to the understandings and selections of the researched presentation methods. And, the theoretical foundation of online product presentation helps to construct the hypotheses formulation and justification.

2.1 Online visual merchandising of apparel websites

Visual merchandising (VMD), the presentation of a firm and its merchandise to attract potential customers and facilitate purchasing (Diamond and Diamond, 2003), assumes an especially important role in the online context. Academic research (Eroglu et al., 2003 Menon and Kahn, 2002; Park and Ku, 2002) shows that website characteristics can affect consumer behavior and attitudes toward websites (McMillan et al., 2003). VMD of apparel websites may be more critical than VMD for websites selling other types of products. Because apparel is an experience good (Ekelund et al., 1995), its quality can only be fully determined after purchase, and thus, the inability to try on apparel before purchase is a major risk when shopping remotely (Kim and Lennon, 2000; Kwon et al., 1991).

Graphics can make the website page more interesting (Rowley, 2002). color and fabric information, such as texture details, are often depicted graphically and may also be important determinants of consumers' shopping behaviors such as site patronage and purchase intent. Regarding apparel display method, Then and DeLong (1999) highlight the importance of using a human model to show the natural drape of the garment. Their respondents chose a human model display as the best method of website apparel display method, a flat display second, and sketches of the product third.

The VMD elements of apparel retail websites are comprehensively researched and a taxonomy of online VMD stimuli is developed (Ha et al, 2007). In this research, the summarized manner of product presentation of apparel retail websites is highly useful for having an overview of presentation methods and further selecting the researched presentation methods. The categories of the presentation methods of different product view and product display methods are referenced in the further research.

2.2 Theoretical foundation of online product presentation

Because the visual perception plays a dominant role on perception in the online shopping environment of apparel product, online product presentations are typically graphic-based, in order to facilitate consumers' understanding of how a product looks like, interacts with human body and performs under different conditions.

Vessey and Galletta (1991) suggest that different types of presentation methods significantly influence the quality of cognitive learning. Hence, within the context of online product presentations, the key question is: What is the most appropriate type of pictorial presentations to

help consumers with product understanding? Two relevant streams of research are accordingly discussed below: multimedia learning and active learning.

2.2.1 Multimedia Learning

A multimedia environment includes information that are presented in more than one sensorimotor channel, such as the visual channel, including static images and dynamic animation or video (Mayer 2003; Mayer et al. 1999). Multiple previous researches have shown that appropriate use of multiple sensory stimuli in multimedia can effectively represent nonverbal information, enhance learning performance and experience, and help form mental representations of objects (Carney & Levin 2002; Mayer et al. 2003; Mayer & Gallini 1990; Moreno & Mayer 2002)

Cue-Summation Theory and Dual Coding Theory

The effectiveness of learning in a multimedia environment can be explained and predicted by two fundamental theories in communication: the cue-summation theory and the dual coding theory.

The cue-summation theory suggests that learning is more effective as the number of available stimuli (either across channels or within channels) (Moore et al. 1996; Severin 1967). Severin (1967) has further noted that stimuli must be relevant in order to enhance learning. He has asserted that the learning effect will be inferior when irrelevant stimuli are combined (p. 397), which indicates the learning effectiveness would become better.

The dual coding theory is about the nature of symbolic and sensorimotor systems. while symbolic systems are related to how perceived information is processed and involves verbal and nonverbal systems. An important assertion of the dual-coding theory is that verbal and nonverbal systems function independently and can have additive effects on human memory and understanding (Paivio 1991).

Therefore, the effects of multimedia learning are largely due to the fact that multimedia can utilize multiple sensory channels to convey information to users, which builds respective mental representations in both verbal and nonverbal systems. These two types of representations corresponding to the same object strengthen each other, and consequently facilitate understanding.

Working Memory and Split-Attention Effect

Another theoretical foundation for multimedia learning is on working memory and split attention effect. Research on working memory assumes that people only have limited working memory to process incoming information; therefore, if one's working memory is overloaded, the learning effect will deteriorate (Baddeley 1992). Research has also found that the effective size of working memory can be increased by presenting information in a mixed channel (e.g., visual and text) compared to in a single channel (e.g., visual only).

Applying the theories on working memory to multimedia learning, Mayer and Moreno (1998) have proposed a split attention effect. They argue that the visual channel is typically associated with a heavy cognitive load, such as onscreen text and pictorial information, and therefore people have to split their attention among these visual stimuli. In this context, learning is improved if on-screen text is presented as verbal narration, so that it can be processed through the verbal channel, thus freeing the capacity of visual channel to process pictorial information more extensively.

2.2.2 Active Learning

Several recent studies in the multimedia and education literatures have argued that multimedia should provoke active learning in order to improve learners' performance and their learning experiences (Carroll et al. 1985). For example, Mayer (2003) has suggested that meaningful learning occurs when learners build mental representations while processing information is presented to them.

Both studies argue that active learning includes paying attention to the process of selecting relevant information from words and pictures, mentally organizing the words and pictures into coherent verbal and pictorial representations (internal connections) and integrating the representations with one another and with relevant prior knowledge (external connections or referential connections).

Carroll et al. (1985) have suggested that active learning typically takes the form of learning by doing, by thinking, and by knowing. Specifically, in an active learning mode, learners prefer to try things out rather than reading or following structured step-by-step formulae. They prefer to make sense of their learning experiences by developing and examining hypotheses rather than by depending on rote assimilation of information. They also tend to relate their learning experiences to prior knowledge or metaphors (Carroll and Mack, 1999) to figure out how to perform certain processes and to decide which processes to perform.

In summary, based on the theories of multimedia learning and active learning, online product presentations should include multiple sensory stimuli and involve more extensive active interactions with consumers, to facilitate consumers' product understanding.

2.3 Selection of popularly used online presentation methods

Base on the previous studies of the online visual merchandising of apparel websites and the theoretical foundation of online product presentation, an overview of current online apparel product presentation methods has been built. And, the theoretical understandings of material communication through the online presentation become clearer. Therefore popularly used online presentation methods that are related with material perception need to be further selected to study on.

2.3.1 Selection consideration

Since the apparel retailing websites have various segmentations, some influential factors are further considered in order to address consumer heterogeneity.

Existing evidence from research showed the importance of gender differences in influencing consumers' online shopping behaviours. Previous research has indicated that gender relates to the perception towards online shopping, which eventually influences preferences and purchase decisions over the Internet. Garbarino and Strahilevitz (2004) also found that even when the use of the Internet was controlled, women perceived a greater degree of risk in buying products online than men. A study by Chiu et al. (2005) showed that male consumers had a lower mean value of perceived usefulness of online shopping when compared with female consumers, indicating that male consumers are less likely to consider the Internet useful for making purchases.

On the other hand, consumers' own purchasing experience of clothing influence their acceptance of online shopping (Swaminathan et al., 1999; Lian & Lin, 2008) and it obviously

influences consumers' online shopping experience. In this way, experience is considered important in forming customers' perceptions, regarding their expectations from online retailers. Liang and Huang (1998) have found that high-experienced customers are more likely to continue shopping. Successful previous purchases and satisfaction that derives from them may increase customers' effort expectancy and performance expectancy. Regarding the prediction of online shopping acceptance, Liang and Huang (1998) have found that customers have different concerns according to their level of experience.

Generally speaking, females are more experienced in online clothing shopping. In this way, the female segmentation is chosen to reflect trends in online shopping patterns which show that younger female consumers buy more clothes online than in-store (Mintel, 2014).

2.3.2 Studies of popular online shopping websites

Based on previous reviews, 19 popular online shopping websites, which are apparel retail websites or have the clothing category, were studied. There were two main criteria for selecting those websites: 1) Popular websites of online apparel for the female customers from Europe and China. 2) Companies or brands focusing on online retailing were preferred. The names of 19 online shopping website were listed below.

Names:
Wehkamp, H&M, ZARA Netherlands, Lululemon, Maison Margiela, Everland, Flattered, EASTPAK, ASOS, Farfetch, Paloma Wool, ZALANDO, Rimless, Amii, Diddi Studio, Net-a-porter 韩都衣舍-淘宝, 毛菇小象-京东, 范思蓝恩-天猫

During the studying, the attention has been paid to the effectiveness and the accuracy of presentation methods on the material perception. With these considerations,15 typical presentation methods for apparel product, which are directly or indirectly related to material perception, were picked up for the further selecting. Because this research has focused on the visual perception in terms of the photography, the video and the textual information, these presentation methods are categorized into these three categories based on their formats.

All the photographs with original links could be checked in the Appendix. E

Photography

Overview of product worn by model

This presentation method shows that product is worn by the model in nature postures, and the intact product could be viewed. The background of the photography has a single color, and in most situations the background is white.

Overview of product worn by model in with real environment

This presentation method shows that product is worn by the model in nature postures, and the intact product could be viewed. The photography is taken in a real environment, which could be a indoor setting or outdoor environment. This presentation method is popular in the Chinese online apparel retailing websites.

Close view of product worn by model

This presentation method shows that product is worn by the model in nature postures, and the product could be viewed more clearly when showing the part body of the model. The background of the photography has a single color, and in most situations the background is white. This presentation is achieved the zoom-in function of web technique in most situations.

Overview of product

This presentation method shows that the product lays flat, and the intact product could be viewed. Also, there could be some drapes showing on the product. The background of the photography has a single color, and in most situations the background is white.

3D-overview of product

This presentation method shows that the clothing is worn by model, but the model is invisible, and the intact product could be viewed. The background of the photography has a single color, and in most situations the background is white.

Close view of product

This presentation method shows that the product lays flat, and the part of product could be viewed. And, there could be drape showing on the product. The background of the photography has a single color, and in most situations the background is white.

Material detail (flat)

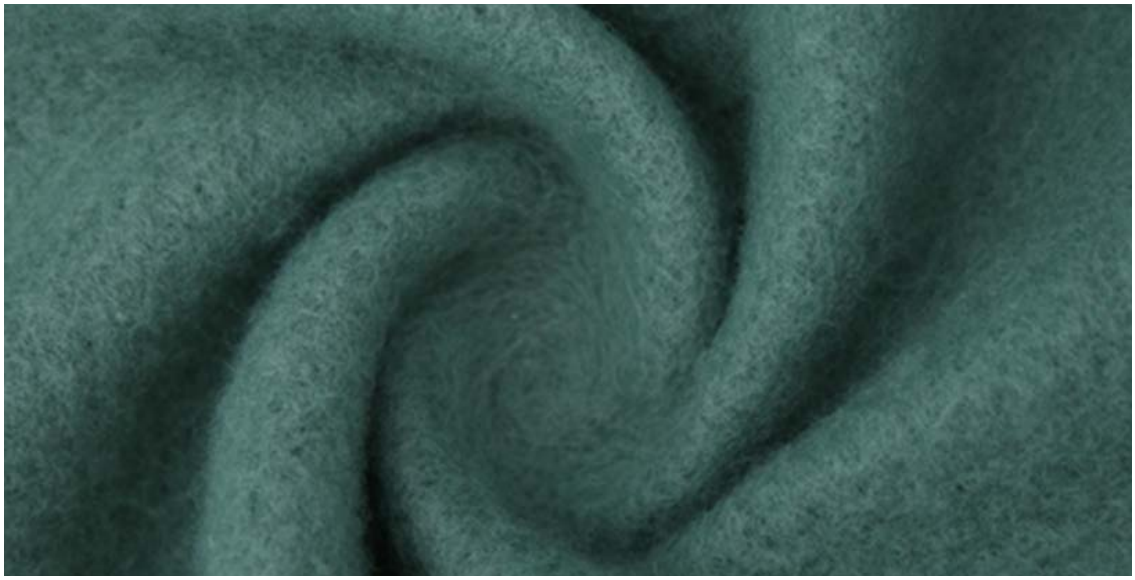
This presentation method focuses on the details of product fabric lying flat. Therefore, there is no information about the form of the product being presented.

Material detail (folded)

This presentation method focuses on the details of fabric folded orderly. Therefore, no product information is presented. And, this presentation method is mainly used in Chinese online apparel shopping websites.

Material detail (scrunched)

This presentation method focuses on the details of fabric scrunched. Therefore, no product information is presented. And, this presentation method is mainly used in Chinese online apparel shopping websites.



Video

Video of a model wearing product and doing some actions

The video is recorded with the professional model wearing with the product and doing some actions to present the interactions between the product and the model body with nature movements and actions.

Textual information

Product description

"This textual presentation method describes basic information of the product features, which could be related to the product material."
"A more feminine shirt dress. This collarless silhouette belts at the waist and is made of lightweight pinpoint Oxford cloth that's ideal for warm weather wear. Did we mention it has pockets?"

Fabric constitution

This textual presentation method describes the proportion of the product material and the material code.

COMPOSITION

Viscose 100% Lining: Viscose 100%

ART. NO. 0678417003

Fabric information

This textual presentation method describes the information of material features.

- Lightweight, very comfortable fabric with a fashionable minimalist print

Fabric

Light Cotton Fleece

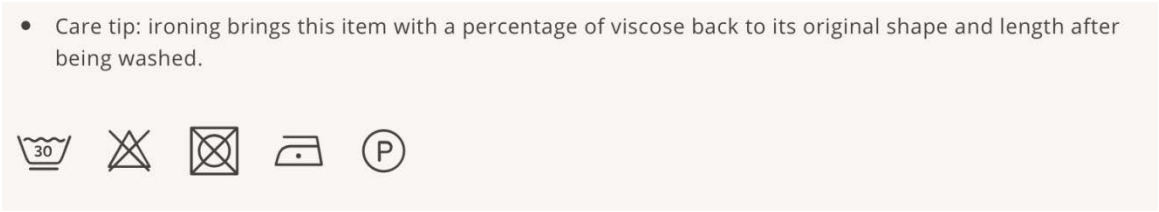
Blended Light Cotton Fleece fabric is naturally breathable,

soft against your skin, and provides lightweight warmth

Breathable	Warm
Soft	Lightweight

Caring information

This textual presentation method describes the caring cautions of the product maintenance or cleaning, which are related with the product material. Some websites only use textual information, but some websites also provide icons that represent certain care information.



Scale references of fabric attributes

This textual presentation method directly describes the level of the certain feature of the product, providing consumers suggestions of feature index, such as thickness, stretchability. Different types of the product might have different scale references. And, this presentation method is mainly used in Chinese online apparel shopping websites.

2.4 Interview for the insight generation

2.4.1 Interview design

Since the relevant knowledge is missing, which is about those presentation methods on material perception of consumers in term of effectiveness and perceived information, a semi-structured interview is designed to collect the consumers' feedback on each presentation in order to decide which presentation method should be further researched.

Three questions are generated spontaneously based on the intuition:

1. What type of apparel product do consumers care more about materials?
2. What feelings of materials are hard to perceive?
3. What information of materials do people mainly get from each presentation method?

In corresponding with the presentation selection considerations, the criteria for the interview participant selection were generated and listed below.

- Female
- Age between 18-38 years old
- Have online apparel shopping experience over 10 times, which represents that they are experienced in online apparel shopping.

In order to get insights of those three questions, 5 unstructured interviews were made firstly. The 15 popularly used online apparel product presentation methods and their examples were shown to interview participants. The interview questions were updated and extended iteratively after every interview, and insights gotten from each interview were recorded and organized immediately after the interview.

After 5 unstructured interviews, important and promising aspects of each question were clarified. Therefore, an interview guide was generated, and 4 semi-structured interviews were conducted.

The intact interview guide could be viewed in the appendix A.

2.4.2 Insights

Based on results from interviews, main insights were listed below:

- Certain types of products have more perception issues, such as dress and coat.
- Attributes of materials that are hard to be perceived were collected, with which people easily make mistakes when shopping for clothing online. 5 attributes, stretchability, smoothness, softness, stiffness and color, are considered to have the most perception issues.
- For some attributes of materials, people may be influenced by opinions from other persons, such as stretchability, Thickness, Roughness, Softness, Stiffness or Transparency. According to some feedback, those attributes are more influential for the material perceptions of apparel online shopping, which need to be further considered in the further research.
- Generally speaking, comparing with the photographs and textual information, more positive feedback is collected about the video.
- The deep understandings have been built, which are about people's considerations and perceived information about 15 selected presentation methods. Proposals of different combinations of presentation methods were made, which are generated to be further studied.

2.5 Proposals of the combinations of the presentation methods

2.5.1 Input from Wehkamp

Wehkamp is an unique online stores in the Netherlands, as it has started selling products online with Wehkamp.nl from 1995. It was founded in 1952 as a mail order company and then transformed into a 100% online department store in 2008. Since then it spent a large amount of time, money and energy into repositioning the brand, but it was seen as old-fashioned by a lot of people. (Ecommerce News, 2018)
The Wehkamp website (Wehkamp.nl) has been thoroughly studied, and its visual merchandising (VMD) of product display page uses a certain template. Based on the analysis of the website, different presentation methods, which are relevant with material perception, are categorized into two perspectives: photography and textual information.

From the photography perspective, based on the previous categorization of online product presentation methods, two types of presentations which are overview of the product worn by model and 3d-overview of it are provided in the most of product presenting pages. Since the photographs can be zoomed in to check the details, the information of close view of product worn by model and close view of product are provided.

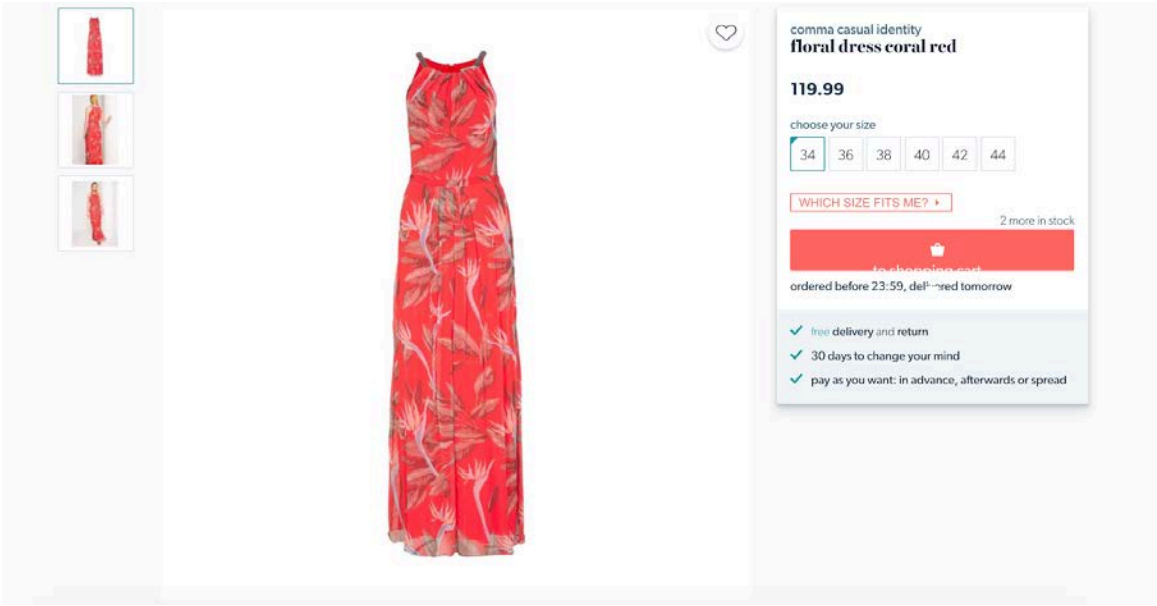


Figure 2.5.1 The layout in the product presetntaion page

As the textual information, material-related information about fabric construction, the fabric color and the care information are provided.

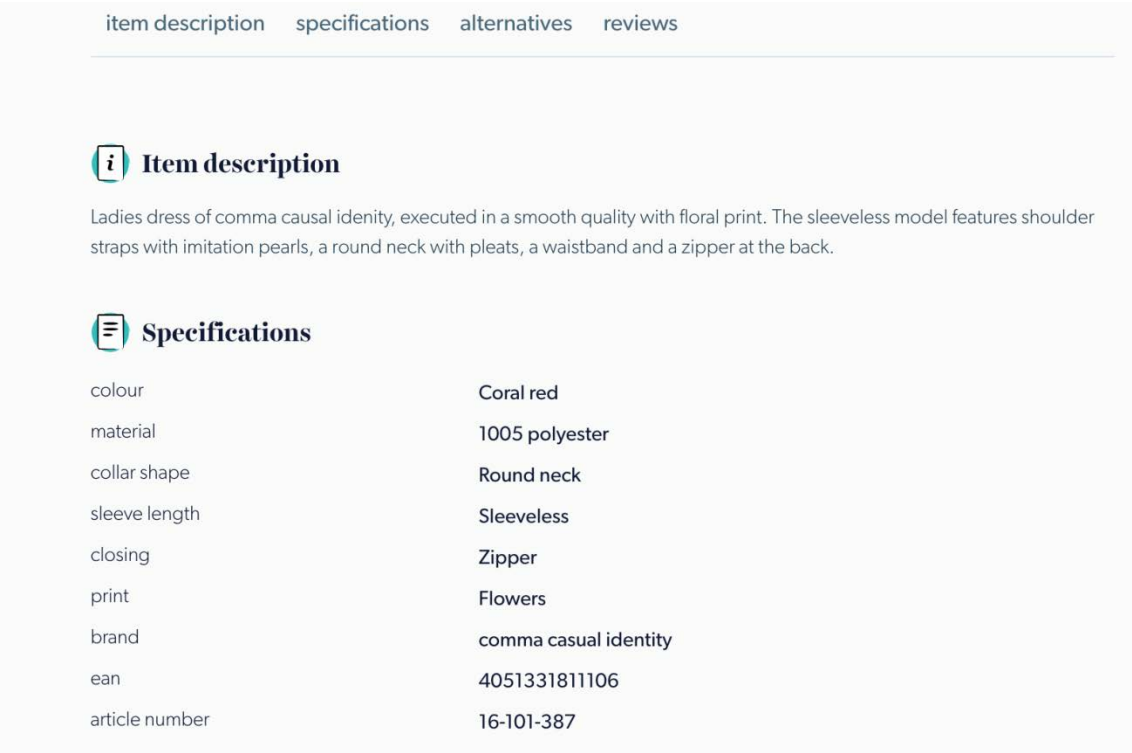


Figure 2.5.2 The textual information

2.5.2 Final selection of online presentation methods

Basic photographs and textual information

Considering the template of product display pages of the Wehkamp, the basic combination of presentation methods is as control group in the experiment. This combination consists of 7 presentation methods:

- Overview of product worn by model
- Close view of product worn by model
- 3D-overview of product
- Close view of 3D-overview of product
- Textual information of fabric constitution
- Textual information of fabric information
- Textual information of care information

The photography in the product display pages of the Wehkamp could be zoomed in and zoomed out by clink to show the detailed information related with material, which represents the presentation technique and interactivity. However, the experiment mainly focuses on the visual perception of online presentation methods rather than interactivity or presentation techniques. Since the essence of this presenting technique is to show more detailed information of the

product, the presentation technique is simplified in the experiment by only providing static close views of the product.

Comparing with the overview of the product showing the product lay flat, the 3D-overview of product provides viewers more information about the product material, such as drapes, and this presentation method is usually used by the Wehkamp. Therefore, the presentation method of 3D-overview of the product is selected to be further studied in the experiment.

Detailed material photographs

According to my studies of the popular online shopping websites, only a few online apparel shopping websites in Europe provide consumers with detailed material photographs, and only the flat view of material is provided. In some Chinese online shopping websites, the photographs of folded and scrunched materials are provided to consumers for building deep understanding of materials. In order to provide participants with more effective information of the material, these three online product presentation methods are all selected to be further studied in the experiment.

- Material detail (flat)
- Material detail (folded)
- Material detail (scrunched)

Scale references of fabric attributes

This textual presentation method directly describes the level of certain features of the product, which gives consumers suggestions on the described feature, such as thickness, stretchability. Different types of product might have different scale references. According to my studies of popular online shopping websites, this presentation method is popularly used in Chinese online apparel shopping websites, but it has not been used in any European websites yet. It is valuable to test out the influence and effectiveness of the scale references including the information of material attributes, on material perception of consumers. And, consumers' acceptability of this presentation method is worthwhile being tested out within Europeans.

Video of model wearing the product

This presentation method illustrates how the product interacts with human body, which directly presents material-related information to the viewers. It is normally used to present products with the high-end brand or is used by the company has solid financial ability. In this way, It is valuable to test out the influence and effectiveness of the Video of model wearing the product on material perception of consumers.

2.5.2 Personally proposed online presentation method

Video of hands interacting with the product

Based on the previous theories of multimedia learning and active learning, online product presentations should include multiple sensory stimuli and involve more extensive active interactions with consumers, to facilitate consumers' product understanding. In this way, the video of hands interacting with the product is proposed, because it directly contributes to the understanding of material attributes and it includes extensive active interactions between hands and materials, which represents multiple sensory stimuli of real physical contributes of the material.

Extra detailed material photographs of the stretched material

Based on the insight from the interview, the participant said that the stretchability of the product material is missing or hard to perceive. Therefore, the detailed material photographs of stretched fabric are proposed in order to give consumers information about the stretchability of the product material.

The examples of all the selected presentation methods could be checked in the section 3.4.1 Stimuli

2.6 Hypotheses

In this experiment we examine the influences of 5 combinations of online product presentation methods on the perception accuracy of the product materials. The final selected presentation methods are recombined into 5 conditions of the experiment, and samples could be checked in the section 3.4.1.

Condition 1: Basic photographs and text
Condition 2: Basic photographs and text & Extra detailed material photographs
Condition 3: Basic photographs and text & Scale references of fabric attributes
Condition 4: Basic photographs and text & Video of model wearing the product
Condition 5: Basic photographs and text & Video of hands interacting with the product

6 hypotheses are proposed to be tested in the experiment and the relations of these five hypotheses are represented in the figure 2.6.1.

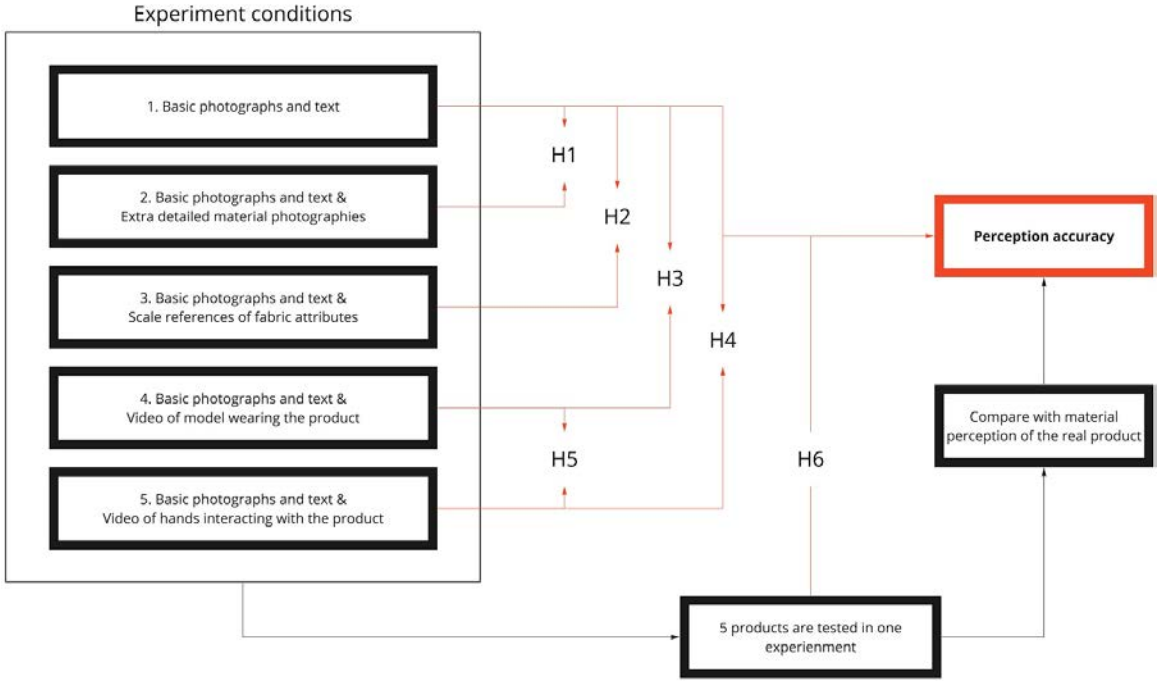


Figure 2.6.1 The relation of five hypotheses

Based on the previous research, the learning is more effective as the number of available stimuli (either across channels or within channels) (Moore et al. 1996; Severin 1967). In this way, extra detailed material photographs provide more detailed and abundant information from the different aspects of the material comparing with basic photographs, such as folded and scrunched material photographs which are provided by several Chinese apparel shopping websites. Associating the previous research, providing the extra detailed material photographs should make the perception more effective, which might make the perception more precise. And as for stretched material photographs, it is proposed by me to show the stretchability of the material. However, these type of presentation methods are not applied in a wide range. Therefore, the effects of these detailed photographs are worthwhile being studied.

- H1: Providing extra detailed material photographs gives positive influences on the perception accuracy comparing with only providing basic photographs and text.

The presentation method of scale references is popular in the Chinese online apparel retailing websites. Based on the research of Paivio in 1991, verbal and nonverbal systems function independently and can have additive effects on human memory and understanding. From this point of view, the scale references provide both verbal and nonverbal information, which should be helpful to the material understanding. According to the customers' review, providing scale references contributes to the customers' better understanding of products. And, it directly influences consumers' perceptions of product materials. Therefore, it is valuable to make a hypothesis of exploring their influences on better communication of product material.

- H2: Providing scale references gives positive influences on the perception accuracy comparing with only providing basic photographs and text.

Previous suggests that the appropriate use of multiple sensory stimuli in multimedia can effectively represent nonverbal information, enhance learning performance and experience, and help form mental representations of objects (Carney & Levin 2002; Mayer et al. 2003; Mayer & Gallini 1990; Moreno & Mayer 2002). Therefore, providing a video of a model wearing product and doing some movements should assist on the mental representations of the material and it becomes more and more popular in online apparel shopping websites. It is interesting to test out the effects of this presentation method on material perceptions. From the material perception perspective, the video of interacting with materials directly contributes to material understandings and communications, because it shows more information that static photographs cannot provide. Therefore, it is worthy to study the effects of the proposed presentation method, the video of hands interacting with materials, on material perceptions, and it is also inspiring to compare the effects of the video of hands interacting with materials with the effects of the video of a model wearing product and doing some movements.

- H3: Providing a video of a model wearing product and doing some actions gives positive influences on the perception accuracy comparing with only providing basic photographs and text.
- H4: Providing a video of hands interacting with products, actions like kneading, stretching, folding and scrunch give positive influences on the perception accuracy comparing with only providing basic photographs and text.
- H5: Providing a video of hands interacting with products, actions like kneading, stretching, folding and scrunch have better or same influences on perception accuracy comparing with providing a video of a model wearing product and doing some actions.

Different materials of one type of apparel product may cause distinctive impressions on customers. For example, the impression of the jeans dress is totally different from the cotton dress. This might also lead to the material perception discrepancies. Therefore, it is necessary to make hypotheses of the distinction of one type of product with different materials in order to further research the exact reasons and effects of these discrepancies.

- H6: One type of apparel product with different materials have distinctive influences on perception accuracy.

3. Methodology

This experiment investigates the effects of several combinations of online product presentation methods on consumers' actual and perceived material understanding and further assesses the perceived information and effectiveness of these presentation methods.

A within-subjects experiment with 5 conditions was designed to understand the accuracy of material perceptions in terms of different combinations of online apparel product presentation methods.100 female participants will be recruited to participate a half hour experiment. For each condition, those participants will fill out one rating questionnaire after checking experiment stimuli and one questionnaire after checking the real product. 12 participants will be selected to have a semi-structured interview in order to get deep understandings of effects of each presentation method and perceived information from different presentation methods.

Different presentation methods of online apparel product, which are popular in the recent online apparel shopping websites, are studied in this experiment, and the major goal is to understand and compare influences of 5 conditions on the material perception accuracy. More specifically, 5 proposals of different combinations of the presentation methods are tested. 5 different dresses are tested in one experiment. For each dress in one condition, mainly three steps are processed:

- Firstly, participants individually view different combinations of photographs, text and videos, which are related with product materials. (check details in the section 3.4)
- Secondly, participants rate their material perceptions with 11 measurements after finishing viewing and checking the real viewed product.
- Thirdly, selected participants are interviewed for getting their deep understanding of their perception justifications related with materials from each presentation method.

3.1 Participants

A sample of 100 female students of TUD is recruited to participate an experiment around 30 mins. Each participant conducts one experiment with 5 conditions in 5 different combinations of product presentations. For one participant, 5 different dresses are tested under 5 conditions respectively. After finishing 100 experiments, each condition of each dress should embrace 20 participants.

Based on the previous review, the gender and consumers' purchasing experience of clothing influence their shopping experience. The female sample is chosen to reflect trends in online shopping patterns which show that younger female consumers buy more clothes online than in-store (Mintel, 2014). Because of the accessibility, students from TU delft are chosen for participating the experiment.

Age is another influential demographic factor of online shopping experience. Millennials - born between 1980 and 2000 - are both the 20th century's last generation and its first truly digital one. They are also known as heavy internet users. Base on the global research, more than 70% online shoppers are Millennials (Statista, 2018). In this way, people aged between 18-38 are considered to be the focused segmentation of this experiment because of accessibility and impact considerations.

Above all, main criteria for selecting participants are based on the age and online apparel shopping experience. More specifically:

- Participants are aged between 18-38
- Participants have more than 5 times online apparel shopping experience in last one year

3.2 Product selection

The Wehkamp provide 11 dresses to be further selected. According to the explanation of the Wehkamp, those dresses are the products that have high returning rates. The product codes of those 11 dresses are listed below and they can be used to search the product in the website, https://www.wehkamp.nl.

Product codes for 11 dresses are:
311487, 931019, 277980, 354059, 968594, 967939, 969159, 767067, 16039780, 719235, 16034818

3.3.1 Criteria for the dress selection

5 dresses are selected to be tested in the experiment basing on 3 main criteria:

- Unexpected features of material
- Products in the same type but have comparable and distinctive features.
- Distinctive material features based on the experiment perception measurement
    - Thickness, Weight of fabric, Glossiness, Colorfulness, Transparency, Stiffness, Stretchability, Roughness, Softness, Coldness of touching, Fragility

3.3.2 Selected dresses

Product A

Figure 3.3.1 16034818-jersey dress olive green

Product B

Figure 3.3.2 719235-blouse dress with ruffles

Product C

Figure 3.3.3 16039780-dress with pleats

Product D

Figure 3.3.4 968591-
lined wrap dress with ruffles

Product E

Figure 3.3.5 931019-
Diovanna dress

3.2 Experiment design

In this research, a within-subjects experiment with 5 conditions was designed to understand the accuracy of material perceptions in terms of different combinations of the selected online apparel product presentation methods.

At least 100 female participants are recruited to participate this experiment. In each condition, those participants will fill out one questionnaire after checking experiment stimuli and another questionnaire after checking the real product. 12 participants will be selected to have a semi-structured interview in order to get deep understandings of effects of each presentation method and perceived information from different presentation methods. Furthermore, those understandings could be used to compare and improve different presentation based on the participants' insights.

5 conditions, which are conducted by one participant in an intact experiment process, are listed below.

1. Basic photographs and textual information
2. Basic photographs, textual information and extra detailed material photographs
3. Basic photographs, textual information and scale references
4. Basic photographs and textual information following with a video of model wearing product
5. Basic photographs and textual information following with a video of hands interacting with the product

In order to eliminate the influence of the sequence of dress presenting and conditions, 20 settings of the experiment are designed. In each setting, the 5 dresses are presented in the 5 conditions respectively, and the combination of the dresses and conditions among all the 20 settings are counterbalanced. The relations between the 5 conditions and the 5 dresses can be viewed in graph 3.4.6.

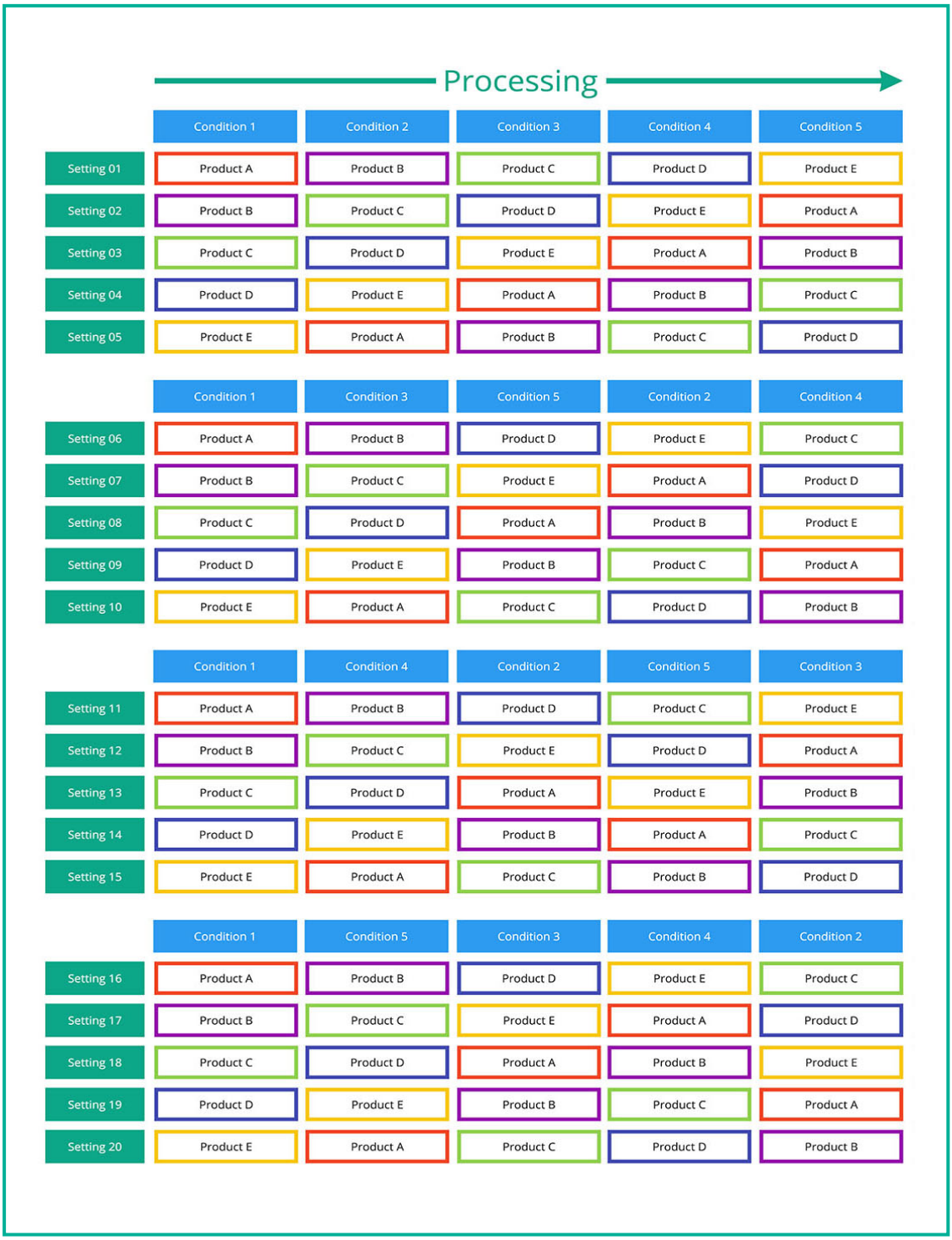


Figure 3.4.6 Experiment setting

For each condition, after participant finishing reviewing all the stimuli, a rating questionnaire for recording participant's perception of the dress is given. After that, the real viewed product is given to the participant, and then a new rating questionnaire is asked to be filled out in order to record participant's perception of the real feeling after checking dress.

12 participants are chosen to have a follow-up interview in order to get deep understandings of effects of each presentation method and perceived information from different presentation methods. Furthermore, those understandings could be used to compare and improve different presentation based on the participants' feedback.

3.4.1 Stimuli

The selected and proposed online presentation methods are recombined into 5 different combinations. The template and example of stimuli for those combinations are shown below. And, the examples use the dress, 719235-blouse dress with ruffles, as the reference.

Basic photographs and textual information

The basic photographs and textual information are generating by using the dress photographs and textual information that is used in the presentation page of Wehkamp website. As the textual information used in the experiment, only the material related information is included. The information of branding, product size, product style is excluded. The layout of textual information is kept to the same format as the textual information used by Wehkamp.

Figure 3.4.7 Photographs of model wearing the product

Figure 3.4.8 Photographs of the product

Figure 3.4.9 Detailed material Photograph

Extra detailed material photographs

Figure 3.4.10 Extra detailed material Photographs

Scale references of fabric attributes

Textual information of scale references is based on the average rating from fabric experts and consumers. 6 scales of the material characteristics are provided as references for the viewed dress. According to the insights from previous interviews, the criteria for these 6 material characteristics are generated, which are highly related with material attributes and are hard to be perceived.

- Stretchability scale
- Thickness scale
- Roughness scale
- Softness scale
- Stiffness scale
- Transparency scale

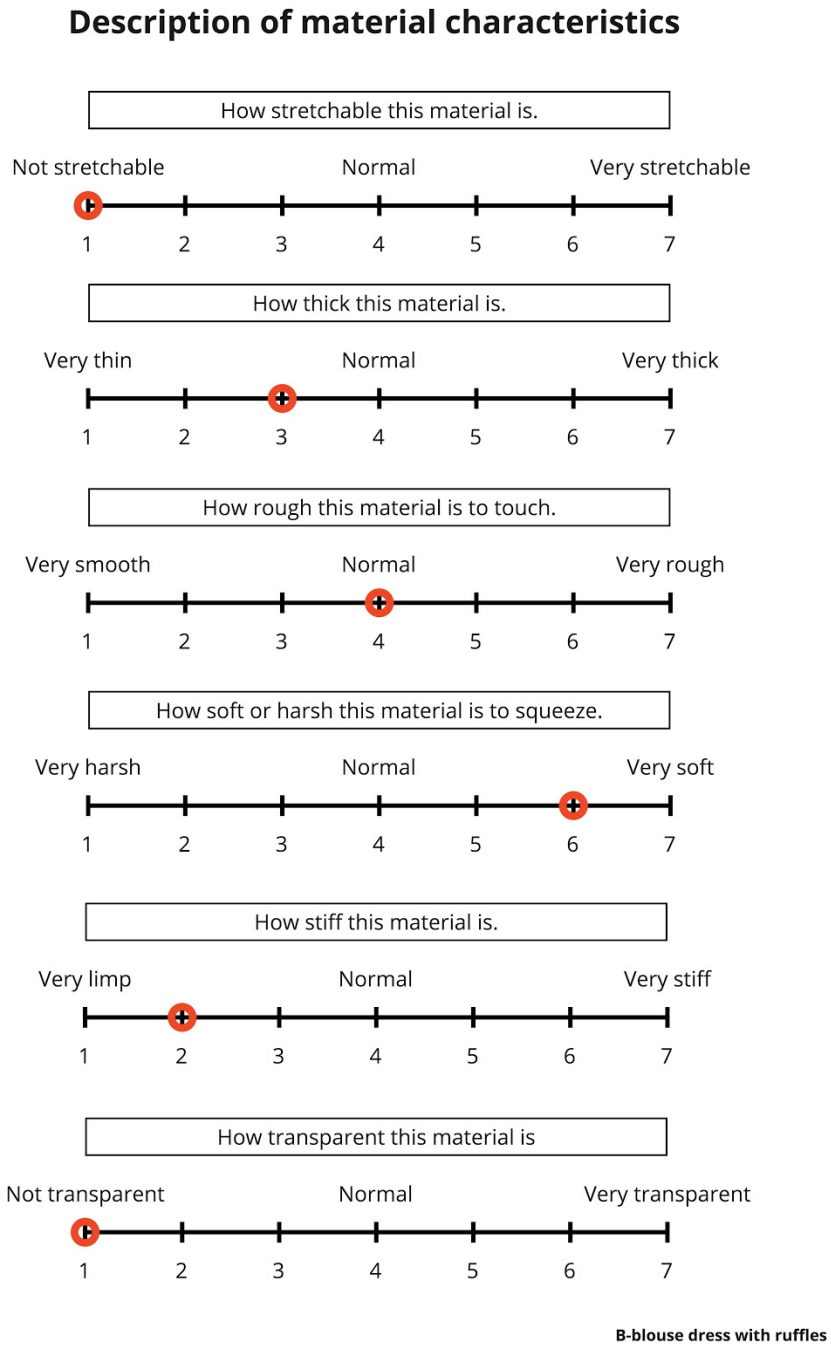


Figure 3.4.11 Example of the scale references

Video of model wearing the product

Figure 3.4.12 The video of model wearıng the product and doing some actions

Video of hands interacting with the product

Figure 3.4.13 The video of hands interacting with fabric

3.4.2 Experiment environment

The experiment environment is set to provide a normal online shopping atmosphere, which is in a quiet and bright space that has a comfortable chair, a table and a laptop.

Figure 3.4.14 Experiment environment

Figure 3.4.15 Beauties are doing the experiment

In order to extract the Interference factors, such as the layout design of websites, indirect information of product materials on webpages and so on, all the stimuli of experiment are presented in a designed and purified webpage with the guidance of sample text.

The intact content and design of experiment could be checked at:
https://www.jingliang-shen.design/stimuls

3.4.3 Experiment procedure

The experiment follows the certain procedure, which is represented in the figure 3.4.16. During the background introduction, the 11 attributes was defined, and the polarity of the ten-point scale (i.e., what low and high values correspond to) was explained. The participants were encouraged to ask questions to clarify their understanding of the material attributes to be rated and the rating scale. Importantly, the participants were not informed that how their input will be analyzed; they were simply told that they would see 5 dresses in 5 different conditions.

4 forms are designed to be filled out by the participants during the experiment in order to record their perception and guide their actions. These 4 forms are:

1. Consent form
2. Information collection form - record the related participant information
3. Perception recording form - record the participants' perception of material in order to compare them with real feeling after seeing and touching the viewed product
4. Presentation review form - collect the participant's feedback on the presentation method of the reference scales.

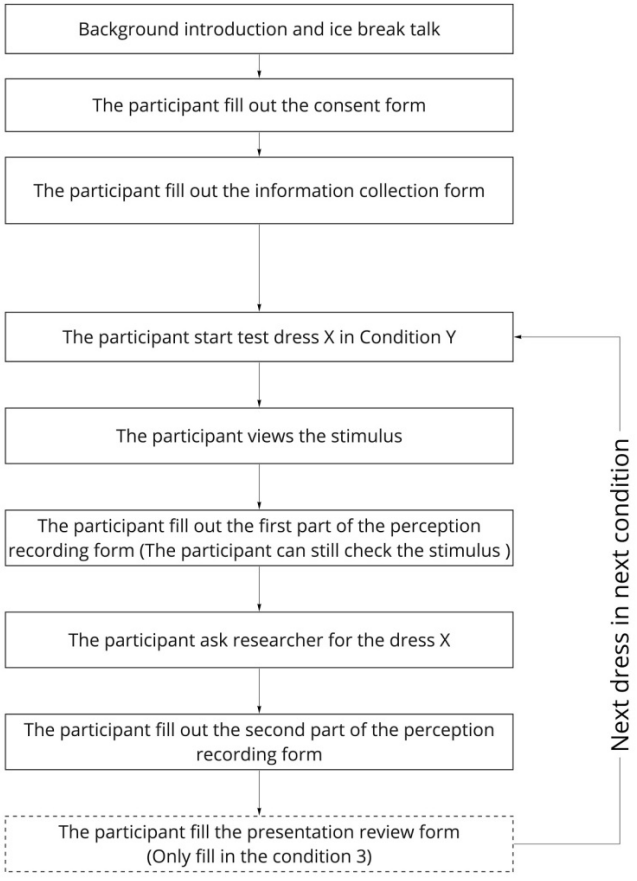


Figure 3.4.16 Experience process

3.4.4 Form design

The simple of 4 forms could be checked in the Appendix. B

1. Consent form

In order to make the participant understand experiment content and protect their private data, a consent form is generated based on the Template Informed Consent Form, which is provided by the Human Research Committee from the website:
https://www.tudelft.nl/en/about-tu-delft/strategy/strategy-documents-tu-delft/integrity-policy/human-research-ethics/template-informed-consent-form/

2. Information collection form

The demographic data of participant is recorded by the information collection form at the beginning of the experiment. The collected information is listed below:

- Age
- Nationality
- Occupation status: If participants are student, the studying programme is recorded

3. Perception recording form

Perception recording form is designed to record the participants' perception of material in order to compare them with real feeling after checking the viewed product. It mainly consists of two rating questionnaires, and the second questionnaire has two more general questions about material and color matching comparing between the impressions of the viewed and checked product.

Measuring the perception of materials is related with the material classification, because both produces include the identification of the material attributes, such as thickness, weight, softness and so on. To gain insights into material classification, Roland W. Fleming and Christiane Wiebel's research about perceptual qualities and material classes in 2013 is reviewed. In this research, 9 material attributes are used to record and measure the participants' perception, and these 9 material attributes, which are Glossiness, Transparency, Colorfulness, Roughness, Hardness, Coldness, Fragility, Naturalness, Prettiness, are referenceable for conducting the experiment related with measuring material perception.

In order to get deep understanding about fabric perception, Griffiths and Kluke's research in 2002 is reviewed, which is about visual sensory evaluation and its correlation to fabric properties. In this research, fabric attributes are measured with visual and tactile measurements and reference standards. Known from this research, the F.A.S.T System (Tester and DeBoos, 1990) was used to measure fabric mechanical properties. F.A.S.T was developed by the CSIRO (Commonwealth Scientific and Industrial Research Organisation) Division of Wool Technology in Australia, and it works by measuring fabric properties through a number of low strain tests (bending rigidity, extensibility, shear rigidity, formability, thickness and weight), the results defines the characteristics of a fabric.

Based on these research reviews, 10 attributes of the material are chosen in order to record the material perception of the experiment participant. Those 10 attributes are Thickness, Weight of fabric, Glossiness, Colorfulness, Transparency, Stiffness, Roughness, Softness, Coldness of touching and Fragility.

From the online clothing shopping perspective, stretchability of the fabric is really hard to perceive according to insights got from the previous interviews. On the other hand, the color matching and the general material matching about the fabric are intuitively and logically useful to be recorded.

Therefore, totally 13 attributes are selected to record the participants' perception in the experiment. The definitions of those 13 attributes are provided for helping participant to understand scales. And, the methods of assessment are made for indicating how participant interact with the fabric when they access the real product.

Thickness
Definition: How thick of one layer of the perceived fabric is. Low thickness indicates that it would feel thin; high thickness indicates that it would feel thick.
Method of Assessment: Look at the fabric and assess its thickness.

Weight of fabric
Definition: The perceived weight of the fabric. Low weight indicates that it would feel light; high weight indicates that it would feel heavy.
Method of Assessment: Look at the fabric and assess its weight.

Glossiness
Definition: It is an optical property which indicates how well a surface reflects light in a specular (mirror-like) direction. Low glossiness indicates a matte, dull appearance; high glossiness indicates a shiny, reflective appearance.
Method of Assessment: Look at the fabric and assess its glossiness.

Colorfulness
Definition: Attribute of a visual perception according to which the perceived color of an area appears to be more or less chromatic. Low colorfulness indicates a grayish or monochrome appearance; high colorfulness indicates a colorful appearance, which could be either a strong single color or several colors.
Method of Assessment: Look at the fabric and assess its colorfulness.

Transparency
Definition: Transparency of fabric describes the idea of see-through clothing. See-through clothing is any garment of clothing that allows the wearer's body or undergarments to be seen through its fabric. Low transparency indicates an opaque appearance; high transparency indicates the material has a transparent appearance.
Method of Assessment: Look at the fabric and assess its transparency.
Stiffness
Definition: The amount of stiffness the fabric sample has. It influences the bending and drape of fabric, which describes how rigid or inflexible the fabric feels. The opposite is limp or flexible.
Method of Assessment: Pick up the fabric and gently fold or shake the fabric to assess how stiff the fabric feels during manipulation.

Stretchability
Definition: How stretchable the fabric feels. Lower stretchability indicates that the material is harder to be stretched; higher stretchability indicates that the material is easier to be stretched.
Method of Assessment: Pick up the fabric and gently stretch the fabric to assess how Stretchable the fabric feels during manipulation.

Roughness
Definition: How rough the fabric feels. The fabric surface feels not even and lumpy. The opposite is smooth.
Method of Assessment: Feel the fabric placed flat on the table by gently running your finger tips on dominant hand across the fabric surface once in all directions and assess the amount of roughness.

Softness
Definition: How soft the fabric feels. The fabric slips easily between the fingers and thumb when rubbed, there is no resistance or drag. The opposite is harsh.
Method of Assessment: Pick up the fabric and gently squeeze the fabric using your dominant hand and assess the amount of softness.

Coldness of touching

Definition: How cold the surface of fabric feels when touching it. Low coldness indicates that the material would typically feel warm; high coldness indicates that the material would feel cold to the touch.
Method of Assessment: Gather the fabric in your dominant hand. Assess how cold the fabric feels during manipulation.

Fragility
Definition: How easy to break the material is. High fragility indicates that a small amount of force would be required to break, tear, or crumble the material; low fragility indicates that the material is highly resistant and could not easily be broken.
Method of Assessment: Pick up the fabric and gently tear the fabric to assess its fragility.

In order to record general impressions of material matching and color matching, two scales are generated and provided to the experiment participant after viewing the real product.

Color matching
Definition: To what extent would you think your perceived color of material match with the real color? Low color matching indicates that the matching level is low; high color matching indicates that matching level is high.
Method of Assessment: View and think of the fabric and assess its color matching.

Impression of this material matching (Focus on material only)
Definition: How well do your impression or perception of this material match with the real product? Low material matching indicates that the matching level is low; high material matching indicates that matching level is high.
Method of Assessment: View and think of the fabric and assess its material matching.

4. Presentation review form

The presentation review form is designed to collect the participant's feedback on the presentation method of the reference scales.

3.4.5 Semi-structured interview

Totally 12 participants of the interview are selected, and 3 participants of each condition sequence (4 different conditions sequence as total) are selected randomly. A permission is asked before the participant attend the experiment.

The interview is taken in the same place as the experiment. After finishing the experiment, participant will have a 5-min break. In the meanwhile, the forms filled by the participants are analysed in order to see the perception differences between viewing stimuli and real products And, all viewed stimuli and products are set up again in order to be discussed by the researcher and the participant together during the interview.

Interview guide

The whole experiment with participant is reviewed by researcher and participant together.

For every presentation method tested in the experiment, participant is asked several questions in sequence:

1. What information do participants perceive from each presentation methods?
2. What information of material do participants perceive from each presentation methods?
3. Could you generally talk about your material perception? Does this perception fit your feeling after checking the real product? What factors or reasons make participant have wrong perceptions?
4. What feelings or information of material are participants missing in each presentation methods?
5. How do you want to improve this presentation?

After reviewing all presentations, some general questions will be asked:

- What do you think about the scale references? Do you believe them? Do they help you know about materials?
- What your options about two different videos? What your focuses on each video? Which one is more helpful for your material perceptions? What other things you want to see from each video? How you want to improve the video?
- Which presentation is the most useful? And why?
- Could you rank the 5 viewed presentation combinations in terms of helpfulness of material understanding?
- Out of 11 attributes of the dresses, what do you care about?
- Which dress fit your perception most, and why?
- Which dress is hard to perceive from the stimuli?

In order to guide the interview structurally, a form is designed to be used by the researcher during the interview, **which could be checked in the Appendix. C**

4. Data analysis

In this chapter, the quantitative data collected from the experiment is analyzed and reported in the section 4.2, the section 4.3, the section 4.4 and the section 4.5. And, the qualitative insights generated from the interviews are summarized in the section 4.7. At the end of the chapter, the hypothesis is evaluated based on the results from the data analysis.

4.1 Quantitative data analysis

The quantitative data analysis was conducted in 5 stages.

- In the first stage, the demographic data obtained from the information collection form were reported in terms of participant age, nationality, occupation status and studying background.
- In the second stage, the data obtained from the experiment through perception recording form will be tested with the method of multiple repeated-measures ANOVA. Two factors are defined as the dress and the condition with 5 levels respectively, which keeps consistent with the experiment design. 3 tests are conducted according to the perception recording form, in which the data is structured as 3 parts: the impression of the color matching, the impression of the material matching and the perception differences.
- In the third stage, the relations between the perception differences of each attribute and the impression of material matching and color matching are explored with the regression analysis.
- In the fourth stage, the perception differences of each attribute are explored in order to see the distinctions among 5 conditions in each dress.
- In the fifth stage, the feedback of participants' reviews on the presentation method of the scale references is reported and illustrated with graphs.

4.2 Results and summary

4.2.1 Response distribution

90 responses are collected by the information collection form in order to collect the participants' demographic data. 5 participants join the setting 1 to 10 respectively, and 4 participants join the setting 11 to 20. From all those 90 experiments,18 groups of intact data of each dress in every condition were collected, in which 450 groups of intact data (18*5*5) are collected.

The frequency distribution of participants' age is illustrated in the figure 4.2.1. It is clearly visible from the figure that the mean of the age is 24.38 and around 90% of the participants are aged between 23 to 28.

The occupation status and the nationality of the participants are shown in the figure 4.2.2 and 4.2.3 We can see from the figure 4.2.2 that around 93.3% of participants are the mater student from TUD, which are 84 persons.

Totally 84 master students participated the experiment. Their studying background are categorized and shown in the figure 4.2.3.

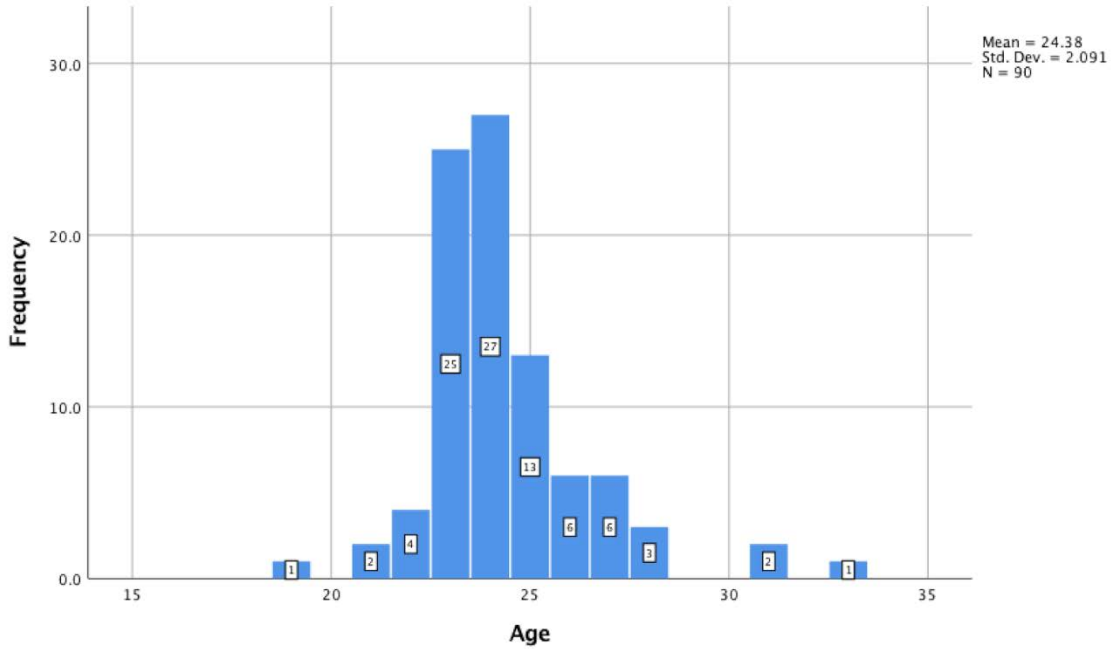


Figure 4.2.1 The frequency distribution of participant ages

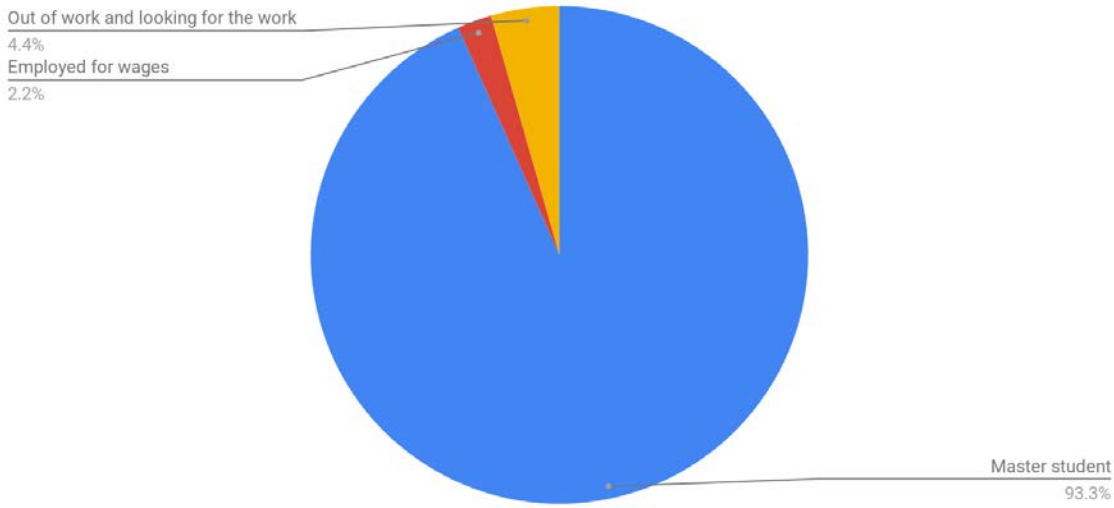


Figure 4.2.2 The pie chart of participants' occupation status

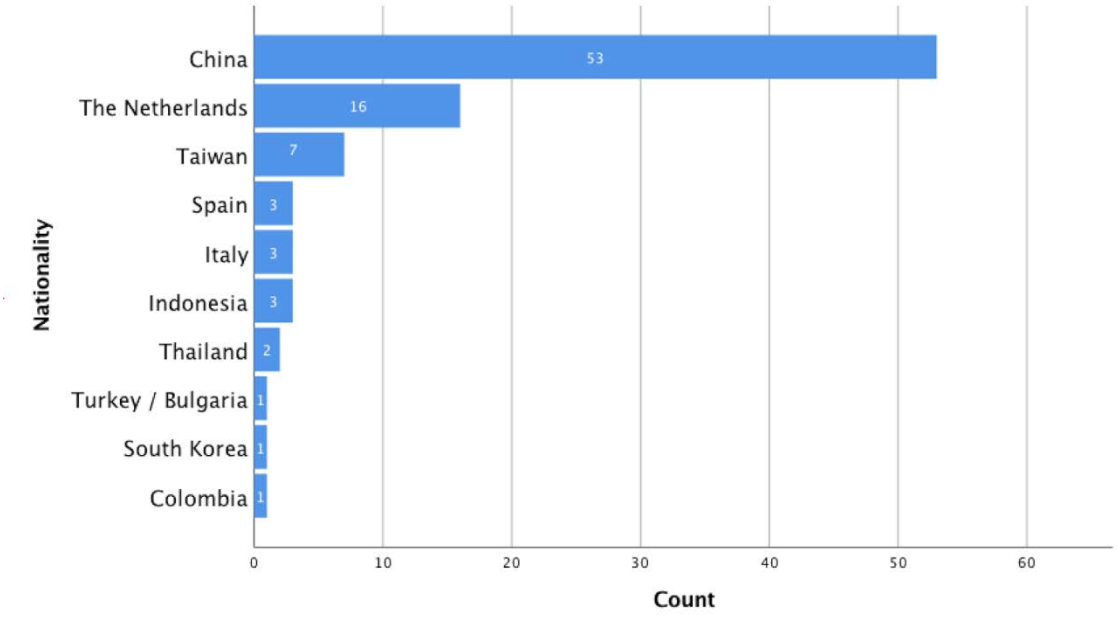


Figure 4.2.3 The histogram of the participant nationality

4.2.2 Repeated-measures ANOVA

Since 90 responses are collected by the perception recording form, the method of repeated-measures ANOVA in SPSS is chosen to further analyze and interpret the collected data. In order to see the differences between 5 conditions for 5 dresses respectively, two factors is defined as "Dress" and "Condition" with 5 levels respectively.

In order to increase the readability of the result, the 5 dresses and 5 conditions are mentioned by their representative and shortened forms in the further analysis:

- Dress A-olive
- Dress B-blue
- Dress C-yellow
- Dress D-black
- Dress E-cyan

- Condition 1-basic
- Condition 2-extra
- Condition 3-scale
- Condition 4-model
- Condition 5-interaction

According to the structure the perception recording form, the analysis and the results are presented in three parts: The impression of the color matching, the impression of the material matching and the perception differences of overall attributes.

Color matching

In total 450 ratings are collected for the impression of coloring matching. Therefore, 18 ratings are collected for each dress viewed in every condition respectively. The score of ratings ranges from 0 to 10, which represents the matching level. The low score indicates that the matching level is low, and the high score indicates that matching level is high.

The results of the repeated-measures ANOVA show that the significant differences exist among 5 different dresses for influencing the impression of the color matching. (F (4, 68) = 7.133, p = .000).

The mean scores of 5 dresses are shown in the figure 4.2.5 Post hoc tests using the Bonferroni correction reveals that there are significant differences between the dress A-olive and D-black (p = .032), the dress B-blue and D-black (p = .009), the dress C-yellow and D-black (p = .001). There are no other significant results.

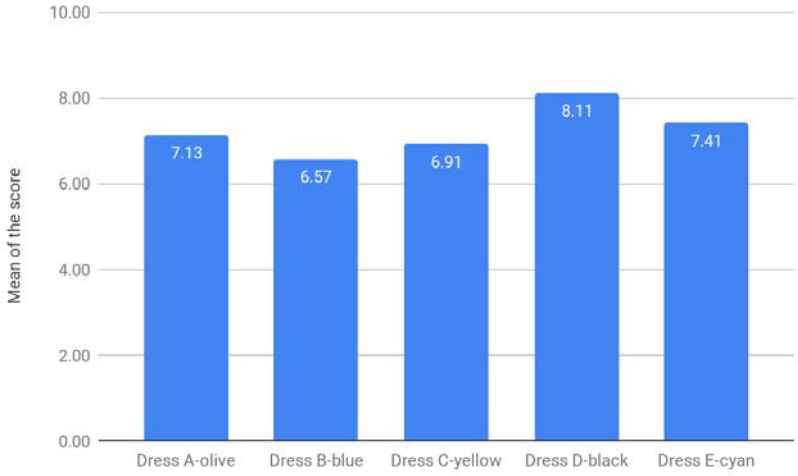


Figure 4.2.5 Mean scores of the impression of the color matching for 5 dresses

- The result statistically suggests that the dress D-black has the highest score for the impression of the color matching, which is easy to understand because the black color is easy to be perceived.

The results of the repeated-measures ANOVA with a Greenhouse-Geisser correction show that no significant differences exist among 5 different conditions for influencing the impression of the color matching. (F (2.722, 46.275) = 1.662, p = .192). The mean scores of 5 conditions are shown in the figure 4.2.6.

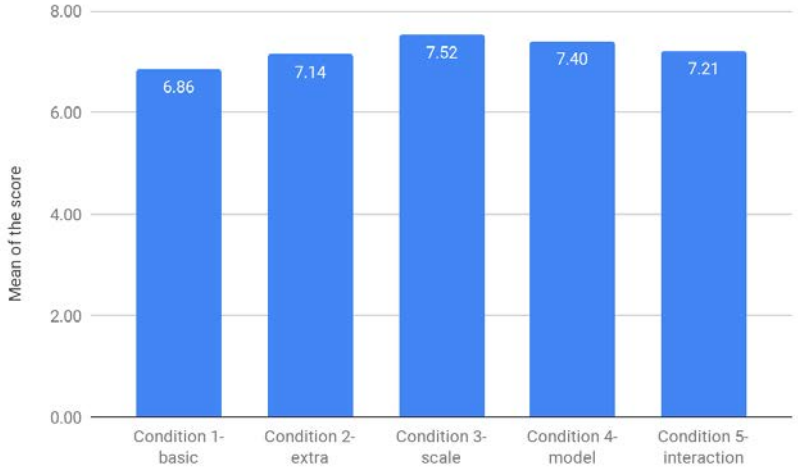


Figure 4.2.6 Mean scores of the impression of the color matching for 5 conditions

The results of the repeated-measures ANOVA with a Greenhouse-Geisser correction showed that there are no significant interactions between the dress and condition. (F (7.641, 129.905) = 1.795, p = .087). The mean scores of the impression of the color matching for 5 conditions categorized by the 5 dressed are visualized in the figure 4.2.7.

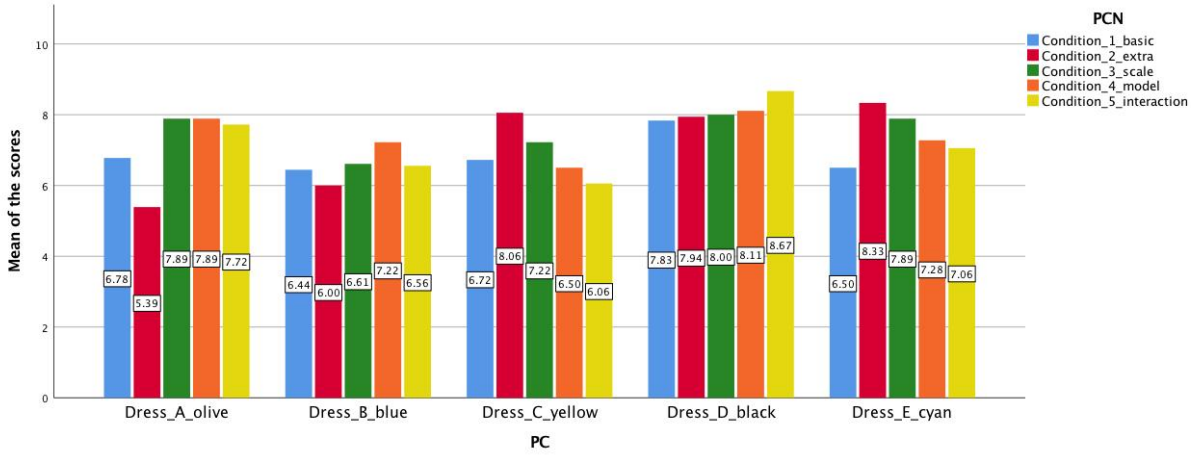


Figure 4.2.7 The means of the impression of the color matching for 5 conditions categorized by the 5 dresses

In order to see the differences among 5 conditions for 5 dresses respectively, several repeated-measures ANOVA analyses are conducted for further exploration. Only the significant results are reported below categorized by 5 dresses.

Dress A-olive

The mean scores of the impression of the color matching of the Dress A-olive for 5 conditions are compared, of which the mean can be checked in the figure 4.2.7. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 2-extra and 3-scale (p=0.014), which indicates that the mean scores of the condition 3-scale is statistically higher than the mean scores of the condition 2-extra.

- The result suggests that for the Dress A-olive, condition 3-scale has positive influences on the impression of the color matching comparing with the condition 2-extra.

Dress C-yellow

The mean scores of the impression of the color matching of the dress C-yellow for 5 conditions are compared, of which the mean can be checked in the figure 4.4.7. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 2-extra and 5-interaction (p=0.010), which indicates that the mean scores of the condition 2-extra is statistically higher than the mean scores of the condition 5-interaction.

- The result suggests that for the dress C-yellow, condition 2-extra has positive influences on the impression of the color matching comparing with the condition 5-interaction.

Material matching

In total 450 ratings are collected for the impression of the material matching. Therefore, 18 ratings are collected for each dress viewed in every condition respectively. The score of ratings ranges from 0 to 10, which represents the matching level. The low score indicates that the matching level is low, and the high score indicates that the matching level is high.

The results of the repeated-measures ANOVA show that the significant differences exist among 5 dresses for influencing the impression of the material matching. (F (4, 68) = 9.713, p = .000). The mean scores of 5 dresses are shown in the figure 4.2.8. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the dress B-blue and C-yellow (p = .000), the dress B-blue and E-cyan (p = .002), the dress C-yellow and D-black (p = .015).

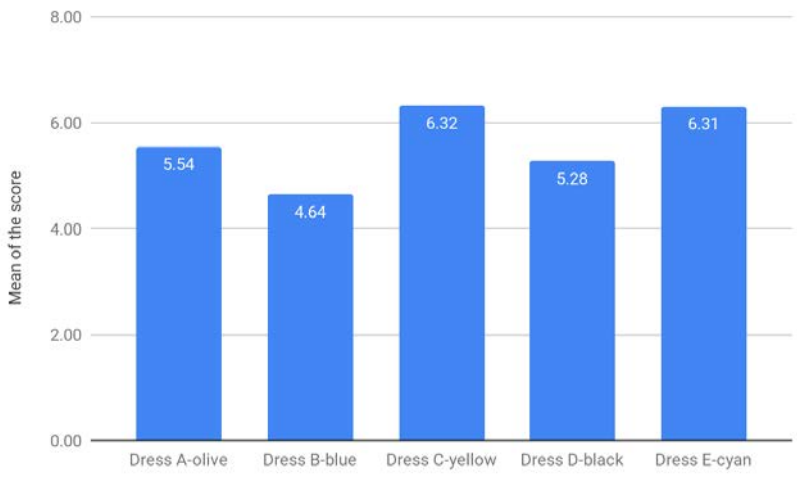


Figure 4.2.8 Mean scores of the material matching scores for 5 dresses

- The result statistically suggests that the dress B-blue and the dress D-black have lower scores for the impression of the material matching, comparing with the dress A-olive, C-yellow and E-cyan.

The results of the repeated-measures ANOVA show that no significant differences exist among 5 different conditions for influencing the impression of the material matching. (F (4.000, 68.000) = 1.006, p = .411). The mean scores of 5 conditions are shown in the figure 4.2.9.

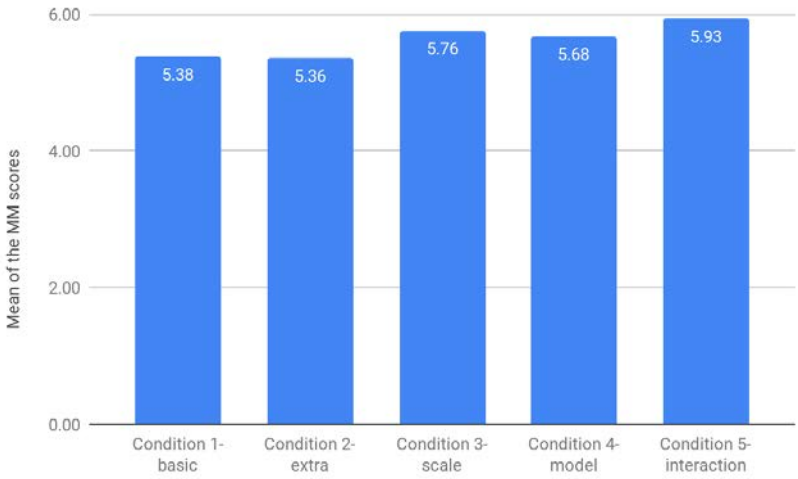


Figure 4.2.9 Mean of the material matching scores for 5 conditions

The results of the repeated-measures ANOVA with a Greenhouse-Geisser correction show that there are no interactions between the dress and condition. (F (7.326, 224.547) = 1.263, p = .272). The means scores of the impression of the material matching for 5 conditions categorized by the 5 dresses are visualized in the figure 4.2.10.

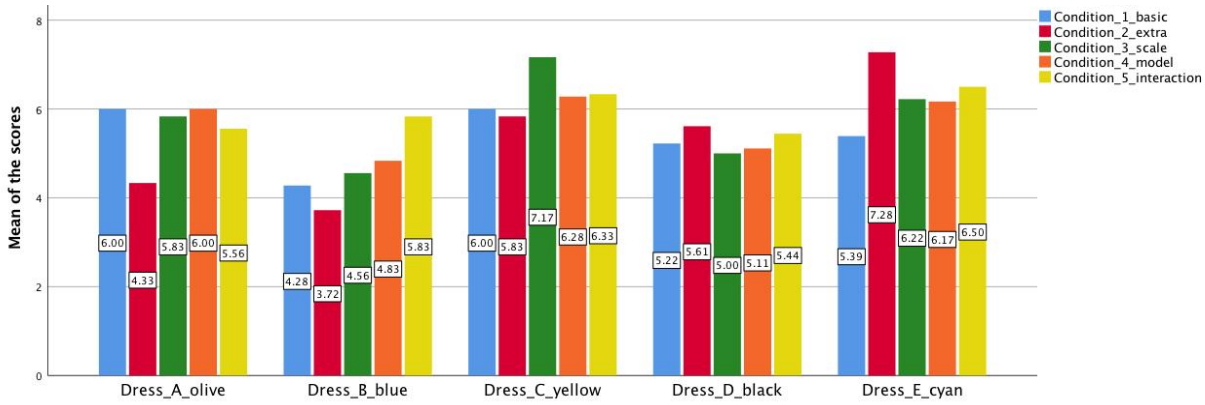


Figure 4.2.10 The means scores of the impression of the material matching for 5 conditions categorized by the 5 dresses

In order to see the differences among 5 conditions for 5 dresses respectively, several repeated-measures ANOVA analyses are conducted for further exploration. Only the significant results are reported below categorized by 5 dresses.

Dress E-cyan

The mean scores of the impression of the material matching of the dress E-cyan for 5 conditions are compared, of which the mean could be checked in the figure 4.2.10. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 1-basic and 2-extra (p=0.002), which indicates that the mean scores of the condition 2-extra is statistically higher than the mean scores of the condition 1-basic.

- The result suggests that for the dress E-cyan, condition 2-extra has positive influences on the impression of the material matching comparing with the condition 1-basic.

Overall perception difference

Since the goal of the experiment is to measure the perception differences between before and after checking the real dress, in order to evaluate the perception accuracy. The ratings of before and after checking the real dresses should be calculated in order to associate with the further interpretation. The calculation follows 2 steps:

1. The rating of after checking the real dress subtracts the matched rating after viewing the stimuli.
2. Get the absolute value of this result

In total, 4950 computed ratings are collected for further analysis of the perception accuracy among 5 conditions for the 5 dress respectively. Therefore, 198 computed sets of data are collected for each dress viewed in every condition respectively. The score of ratings ranges from 0 to 10, which represents the perception differences. The low score indicates that the perception difference is small, which indicated the perception accuracy is high, and the high

score indicates that the perception difference is big, which indicated the perception accuracy is low.
The results of the repeated-measures ANOVA with a Huynh-Feldt correction show that that the significant differences exist among 5 dresses for influencing the perception differences. (F (3.815, 751.608) = 14.819, p = .000). The mean scores of the perception differences of all attributes for 5 dresses are shown in the figure 4.2.11. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the Dress A-olive and B-blue (p = .000), the Dress A-olive and D-black (p = .070), the dress B-blue and C-yellow (p = .000), the dress C-yellow and D-black (p = .000), the dress B-blue and E-cyan (p = .000), the dress D-clack and E-cyan (p = .004). There are no other significant results.

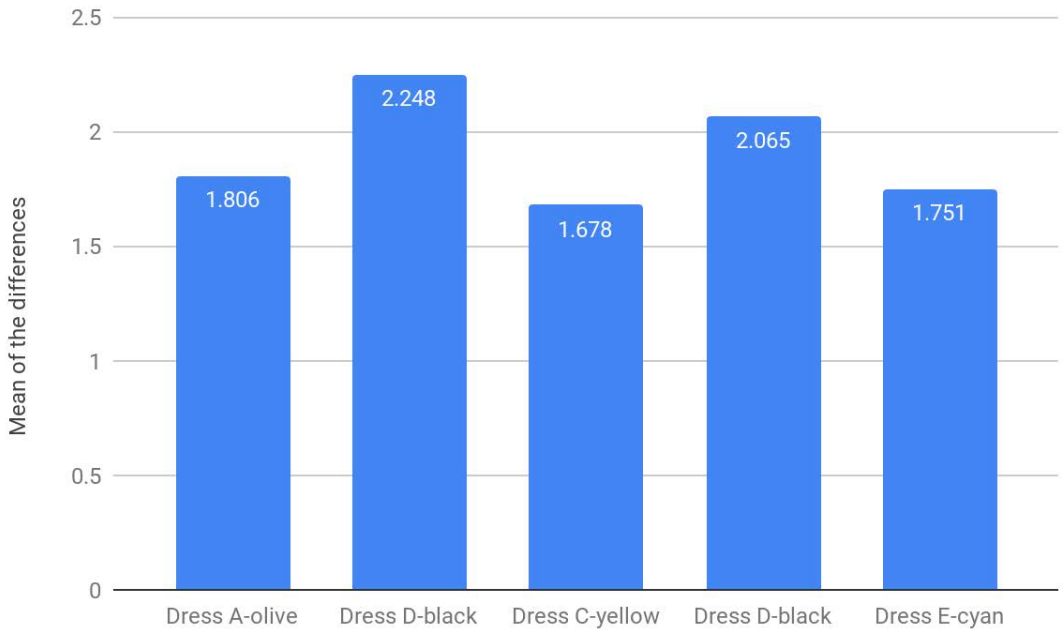


Figure 4.2.11 Mean perception differences for 5 dresses

The result shows that the dress B-blue and the dress D-black have higher scores for the perception differences, comparing with the dress A-olive, C-yellow and E-cyan.

- This indicates that the perception accuracy for the dress A-olive, C-yellow and E-cyan is higher than the dress B-blue and the dress D-black, which is coherent with the results from the impression of the material matching.

The results of the repeated-measures ANOVA with a Huynh-Feldt correction show that the significant differences nearly exist among 5 different conditions for influencing the perception differences. (F (3.901, 768.594) = 2.179, p = .071). The mean scores of the perception differences of all attributes for 5 conditions are shown in the figure 4.2.12. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 1-basic and 5-interaction (p = .073). There are no other significant results.

- This result suggests that the condition 5-interaction has positive influences the perception accuracy comparing with the condition 1-basic.

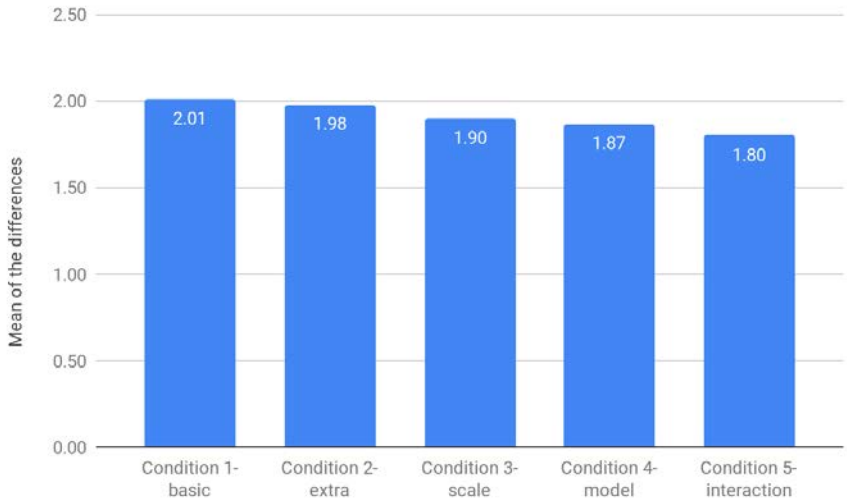


Figure 4.2.12 Mean perception differences for 5 conditions

The results of the repeated-measures ANOVA with a Huynh-Feldt correction show that there are interactions between the dress and the condition. (F (14.844, 2924.289) = 3.476, p = .000). The means perception differences for 5 conditions categorized by the 5 dressed are visualized in the figure 4.2.13.

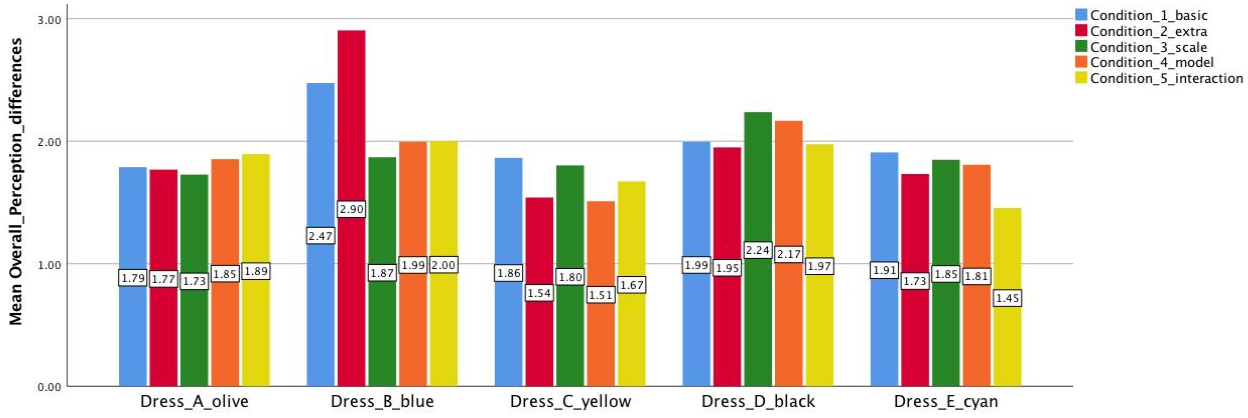


Figure 4.2.13 The means perception differences for 5 conditions categorized by the 5 dressed

In order to see the differences among 5 conditions for 5 dresses respectively, several repeated-measures ANOVA analyses are conducted for further exploration. Only the significant results are reported below, categorized by the 5 dresses.

Dress B-blue

The mean perception differences of the dress B-blue for 5 conditions are compared, of which the mean could be checked in the figure 4.4.13. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 1 and 3 ($p=0.023$), the condition 2-extra and 3-scale ($p=0.000$), the condition 2-extra and 4-model ($p=0.000$), the condition 2-extra and 5-interaction ($p=0.000$), which indicates that the mean of the condition 2-extra are statistically higher than the mean of condition 3-scale, 4-model, 5-interaction. And, the mean of the condition 1-basic is statistically higher than the mean of the condition 3-scale.

The result suggests that for the dress B-blue:

- The condition 2 has negative influences on the perception accuracy comparing with the condition 3-scale, 4-model, 5-interaction.
- The condition 3-scale has positive influences on the perception accuracy comparing with the condition 1-basic.

Dress E-cyan

The mean perception differences of the dress E-cyan for 5 conditions are compared, of which the mean could be checked in the figure 4.4.13. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 1-basic and 5-interaction ($p=0.024$), which indicates that the mean of the condition 1-basic is statistically higher than the mean of the condition 5-interaction.

- The result suggests that for the dress E-cyan, the condition 5-interaction has positive influences on the perception accuracy comparing with the condition 1-basic.

Summary of the results

Overall results

- The dress D-black has the highest score for the impression of the color matching, which is easy to understand since the black color is easy to be perceived.
- The results for the material matching and overall perception differences both indicates that the material of the dress B-blue and the dress D-black are hard to be perceived accurately.
- The condition 5-interaction has positive influences the perception accuracy comparing with the condition 1-basic.

Results for specific dress

For the Dress A-olive

- The condition 3-scale has positive influences on the impression of the color matching comparing with the condition 2-extra.

For the dress B-blue:

- The condition 3-scale has positive influences on the perception accuracy comparing with the condition 1-basic.
- The condition 4-model has positive influences on the perception accuracy comparing with the condition 1-basic.
- The condition 2 has negative influences on the perception accuracy comparing with the condition 3-scale, 4-model, 5-interaction.

For the dress C-yellow,

- The condition 2-extra has positive influences on the impression of the color matching comparing with the condition 5-interaction.

For the dress E-cyan:

- The condition 5-interaction has positive influences on the perception accuracy comparing with the condition 1-basic.
- The condition 2-extra has positive influences on the impression of the material matching comparing with the condition 1-basic.

4.3 Relation between the perception differences and the general impression matching of the material

Logically, the perception accuracy has positive correlation with the general impression matching of the material. For example, if the perception accuracy of the material was high, the impression of the material and the color matching would be high as well. On the other hand, the perception differences of material attributes have negative correlation with the perception accuracy of the material. Thus, it is valuable to explore relations between the perception differences.

In this way, several multiple regression analyses have been done in order to answer two questions at the same time:

- What relations exist between the perception differences of the 11 attributes and the impression matching of the material, in terms of the impression of the material matching and the color matching? Negative or positive?
- Comparing within the 11 attributes, what perception differences of attributes are relatively more influential to the general impression matching of the material?

After the computation in the section 4.2.3, 11 computed attributes, which represent the perception differences of 11 attributes, are renamed ("D" means differences) for further exploration. They are listed below:

- D_Thickness
- D_Weight
- D_Glossiness
- D_Colorfulness
- D_Transparency
- D_Stiffness
- D_Stretchability
- D_Roughness
- D_Softness
- D_Coldness
- D_Fragility

In this way, the independent variables for the multiple regression analysis are 11 attributes, And, the dependent variables are the impression of the color matching and the impression of the material matching respectively.

The goal of the analysis is to compare the relative strength of the influences within the 11 attributes. Only the standardized coefficients with significant result can be used for comparison.

The sign (+/-) of standardized coefficients represents whether the influences between the independent and the dependent variables are positive or negative. The absolute value of the standardized coefficients could be used to compare the strength of influences.

Here is an example to explain:

In the figure 4.3.1, the relative influence strength of the perception differences on the impression of the color matching are represented. It could be interpreted from the figure that:

- The D_Colorfulness and D_Glossiness all have negative correlations with the impression of the color matching, because of the "-".
- The D_Colorfulness relatively has stronger influences on the impression of the color matching, because the absolute value is greater.
- The D_Colorfulness and D_Glossiness are reliable enough to be interpreted, because their results yield a p-value of 0.1.

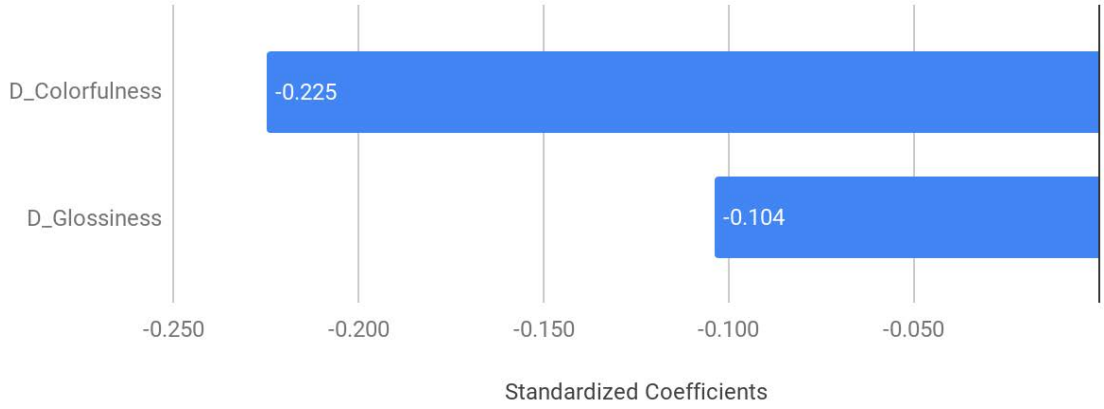


Figure 4.3.1 Standardized Coefficients of D_Colorfulness and D_Glossiness for the impression of the color matching

In this analysis, if the results yield a p-value of 0.1, they are considered as significant results, because the results are only used to qualitatively assist on further interpretation. Based on this standard, the significant results for the impression of the color matching are reported in the section 4.3.1 and the significant results for the impression of the material matching are reported in the section 4.3.2.

4.3.1 Relation between perception differences and the impression of the color matching

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the color matching (R2=.110, F (11,438)=4.917, p=.000). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.2.

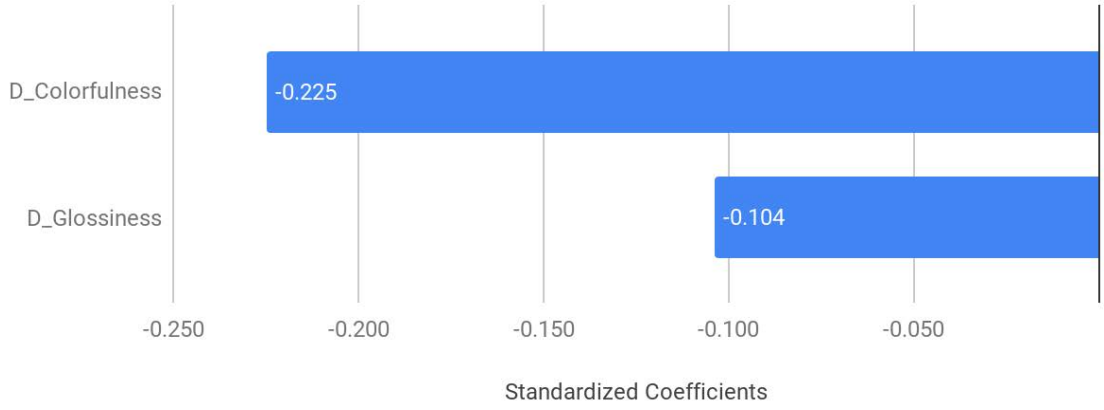


Figure 4.3.2 Relative influence strength of the perception differences with the impression of the color matching

Dress A-olive

A Multiple regression analysis is used to compare the relative strength of the influences on the impression of the color matching within the 11 attributes for the dress A-olive (R2=.324, F (11,78) =3.402, p=.001). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.3.

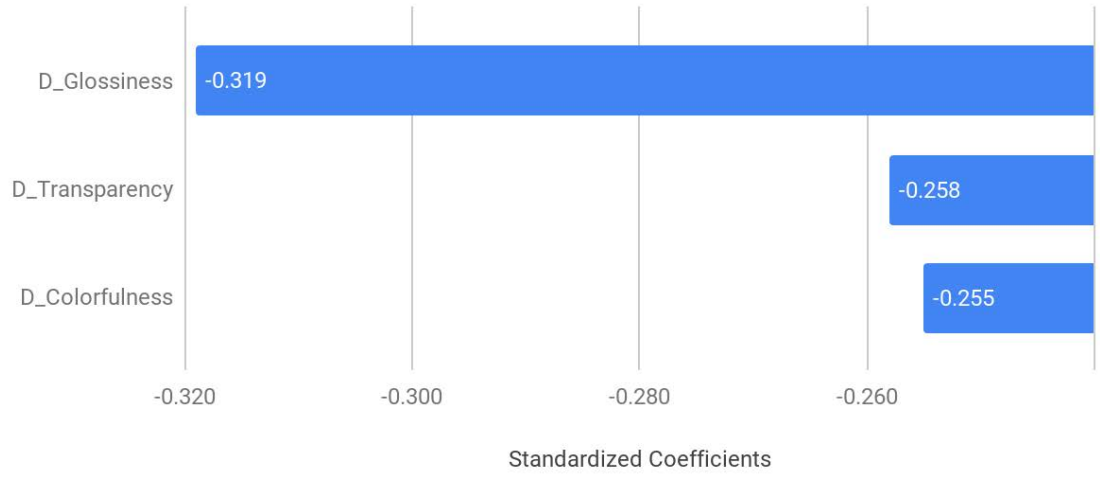


Figure 4.3.3 Relative influence strength of the perception differences with the impression of the color matching for the dress A-olive

Dress B-blue

A Multiple regression analysis is used to compare the relative strength of the influences on the impression of the color matching within the 11 attributes for the dress B-blue (R2=.151, F(11,78)=2.263, p=.026). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.4.

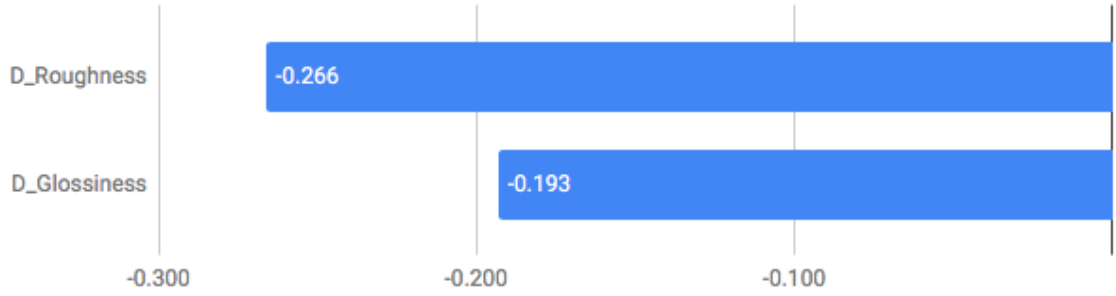


Figure 4.3.4 Relative influence strength of the perception differences with the impression of the color matching for the dress B-blue

Dress C-yellow

A Multiple regression analysis is used to compare the relative strength of the influences on the impression of the color matching within the 11 attributes for the dress C-yellow (R2=.197, F(11,78)=1.737, p=.081). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.5.

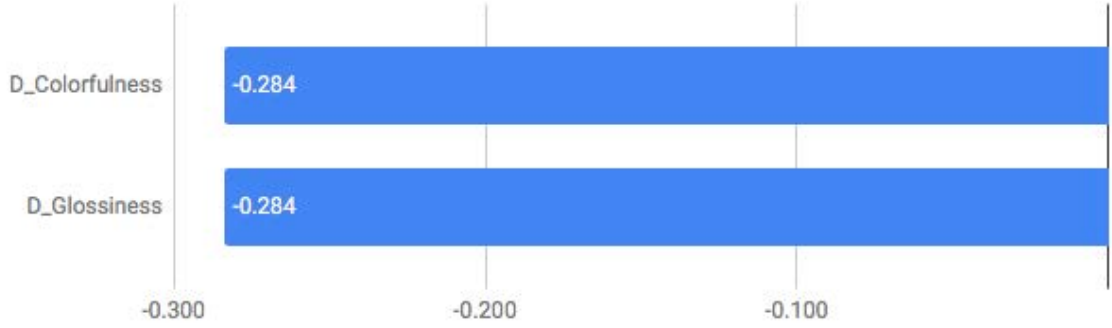


Figure 4.3.5 Relative influence strength of the perception differences with the impression of the color matching for the dress C-yellow

Dress D-black

A Multiple regression analysis is used to compare the relative strength of the influences on the impression of the color matching within the 11 attributes for the dress D-black (R2=.253, F(11,78)=2.406, p=.081). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.6.

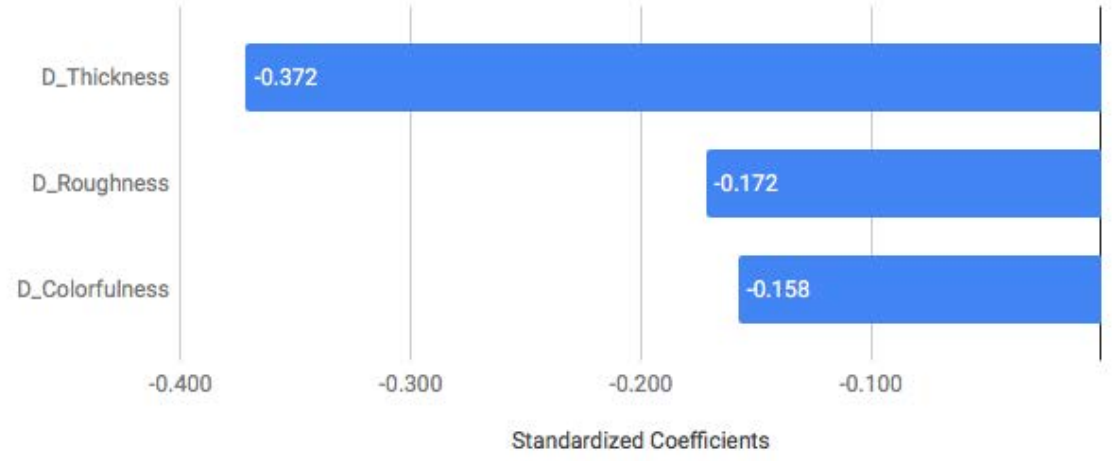


Figure 4.3.6 Relative influence strength of the perception differences with the impression of the color matching for the dress D-black

Dress E-cyan

A Multiple regression analysis is used to compare the relative strength of the influences on the impression of the color matching within the 11 attributes for the dress D-black (R2=.340, F (11,78)=3.657, p=.000). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.7.

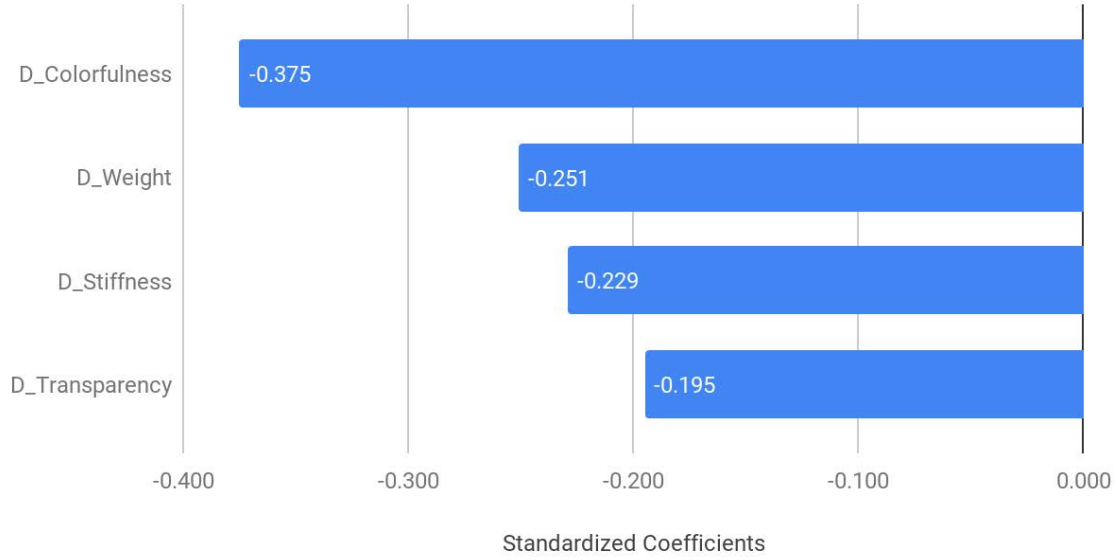


Figure 4.3.7 Relative influence strength of the perception differences with the impression of the color matching for the dress E-cyan

Summary of the results

The significant results of influences of each attribute on the impression of the color matching is organized and summarized. The relative influence strength of the perception differences of the attributes are listed in a descending orderliness.

Overall results

1. D_Colorfulness
2. D_Glossiness

Results for certain dress

Dress A-olive
1. D_Glossiness
2. D_Transparency
3. D_Colorfulness

Dress B-blue
1. D_Roughness
2. D_Glossiness

Dress C-yellow
1. D_Colorfulness and D_Glossiness

Dress D-black
1. D_Thickness
2. D_Roughness
3. D_Colorfulness

Dress E-cyan
1. D_Colorfulness
2. D_Weight
3. D_Stiffness
4. D_Transparency

4.3.2 Relation between perception differences and the impression of the material matching

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching (R2=.278, F (11,438)=15.327, p=.000). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.8.

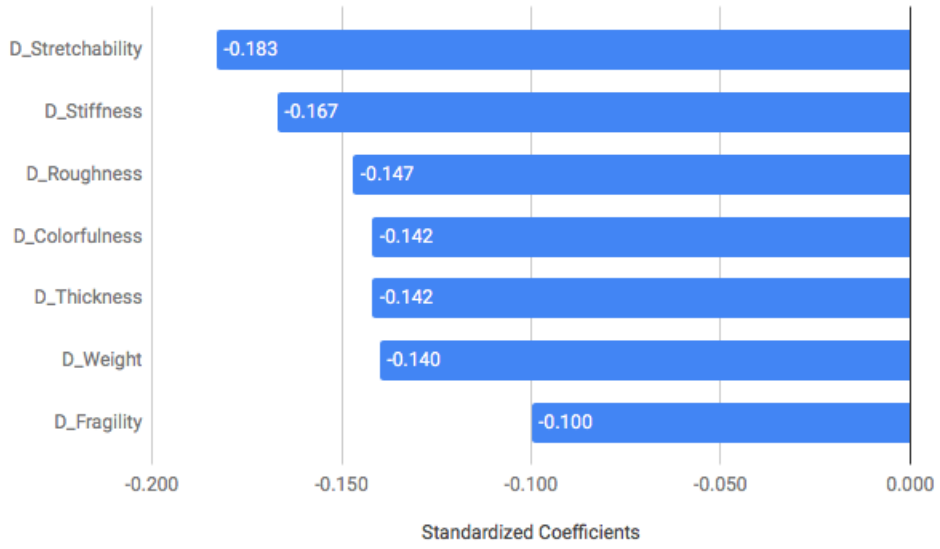


Figure 4.3.8 Relative influence strength of the perception differences with the impression of the material matching

Dress A-olive

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching for the dress A-olive (R2=.258, F (11,78) =2.462, p=.011). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.9.

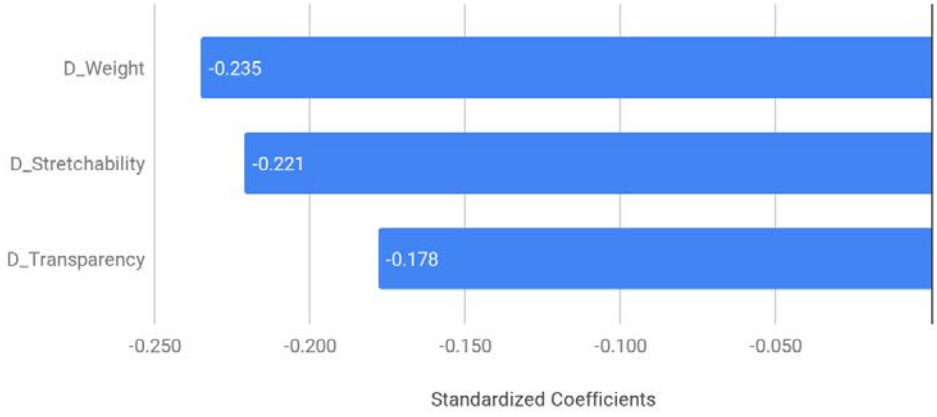


Figure 4.3.9 Relative influence strength of the perception differences with the impression of the material matching for the dress A-olive

Dress B-blue

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching for the dress B-blue (R2=.467, F (11,78) =6.206, p=.000). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.10.

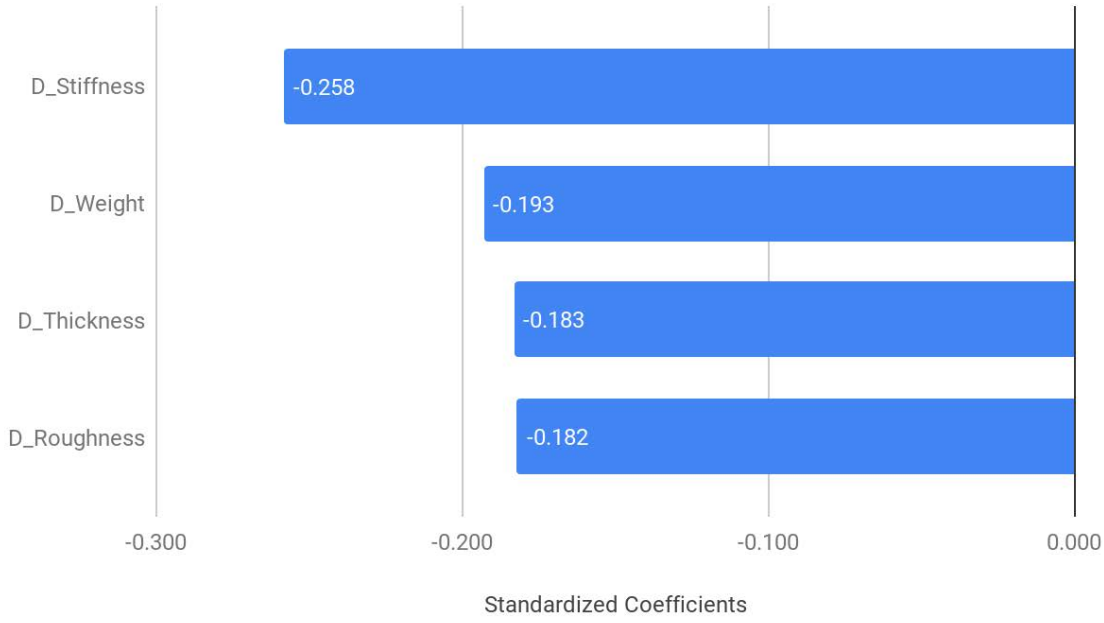


Figure 4.3.10 Relative influence strength of the perception differences with the impression of the material matching for the dress B-blue

Dress C-yellow

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching for the dress C-yellow (R2=.224, F (11,78) =2.043, p=.035). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.11.

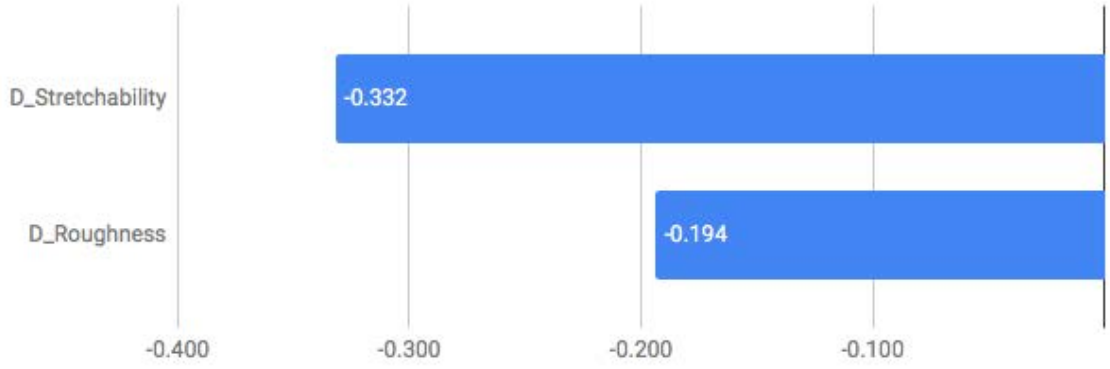


Figure 4.3.11 Relative influence strength of the perception differences with the impression of the material matching for the dress C-yellow

Dress D-black

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching for the dress D-black (R2=.360, F (11,438)=1.902, p=.000). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.12.

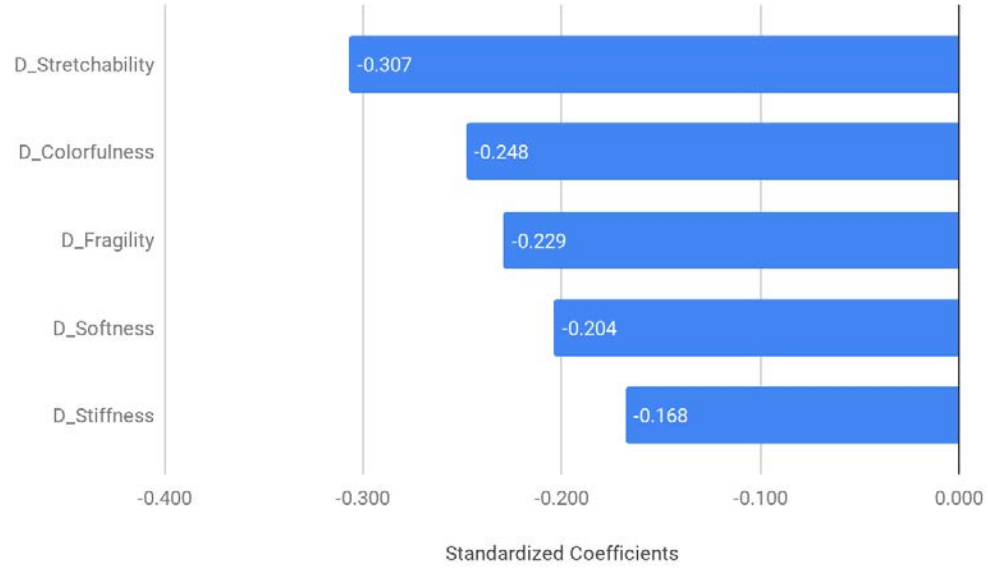


Figure 4.3.12 Relative influence strength of the perception differences with the impression of the material matching for the dress D-black

Dress E-cyan

A Multiple regression analysis is used to compare the relative strength of the influences within the 11 attributes on the impression of the material matching for the dress D-cyan (R2=.212, F (11,78) =1.902, p=.052). The results of the standardized coefficients yielding a p-value of 0.1 are visualized in the figure 4.3.13.

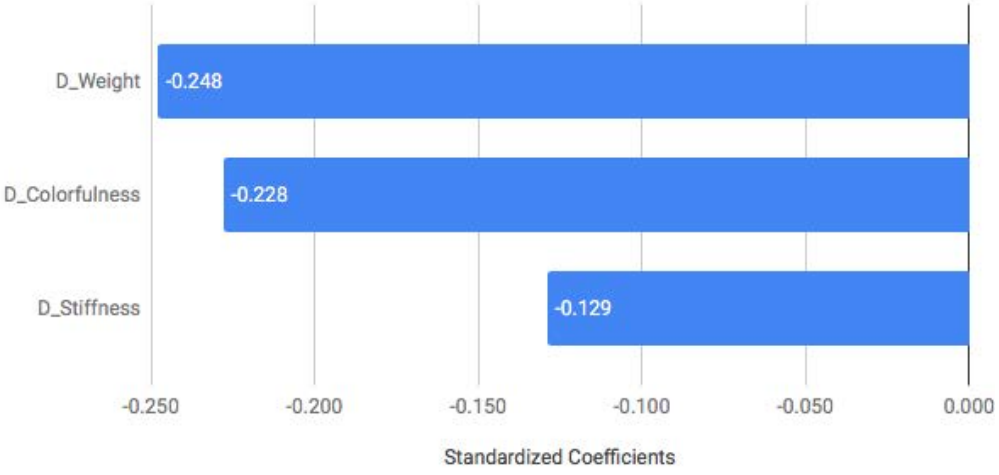


Figure 4.3.13 Relative influence strength of the perception differences with the impression of the material matching for the dress E-cyan

Summary of the results

The significant results of influences of each attribute on the impression of the material matching is organized and summarized. The relative influence strength of the perception differences of the attributes are listed in a descending orderliness.

Overall results

1. D_Stretchability
2. D_Stiffness
3. D_Roughness
4. D_Colorfulness
5. D_Thickness
6. D_Weight
7. D_Fragility

Results for certain dress

Dress A-olive
1. D_Weight
2. D_Stretchability
3. D_Transparency

Dress B-blue
1. D_Stiffness
2. D_Weight
3. D_Thickness
4. D_Roughness

Dress C-yellow
1. D_Stretchability
2. D_Roughness

Dress D-black
1. D_Stretchability
2. D_Colorfulness
3. D_Fragility
4. D_Softness
5. D_Stiffness

Dress E-cyan
1. D_Weight
2. D_Colorfulness
3. D_Stiffness

4.4 Perception differences of each attribute for 5 conditions

In this section, the influences on different conditions on perception differences of 11 attributes are explored. The means perception differences of 11 attributes for 5 conditions are presented in the figure 4.4.1.

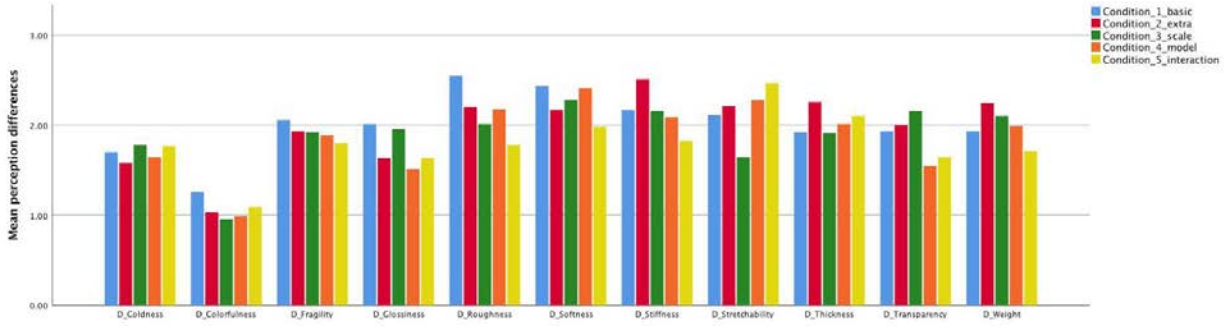


Figure 4.4.1 The means perception differences of 11 attributes for 5 conditions categorized

Unfortunately, only 1 significant result is found for the roughness. The mean perception differences of the D_Roughness for different conditions are compared, of which the differences could be checked in the figure 4.4.1. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 1-basic and 5-interaction (p=0.049), which indicates that the mean perception differences of the condition 1-basic is statistically higher than the mean perception differences of the condition 5-interaction.

- The result suggests that the condition 5-interaction has positive influences on the perception accuracy of the roughness comparing with the condition 1-basic.

Therefore, the influences on different conditions on perception differences of 11 attributes for each dress are explored. The means perception differences of 11 attributes for 5 conditions for each dress are presented from the figure 4.4.2 to the figure 4.4.6.

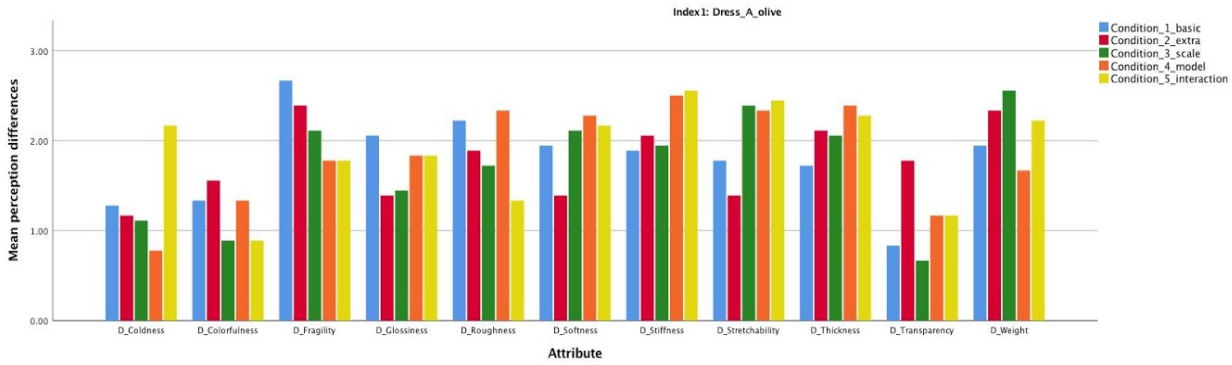


Figure 4.4.2 The means perception differences of 11 attributes for 5 conditions for the dress A-olive

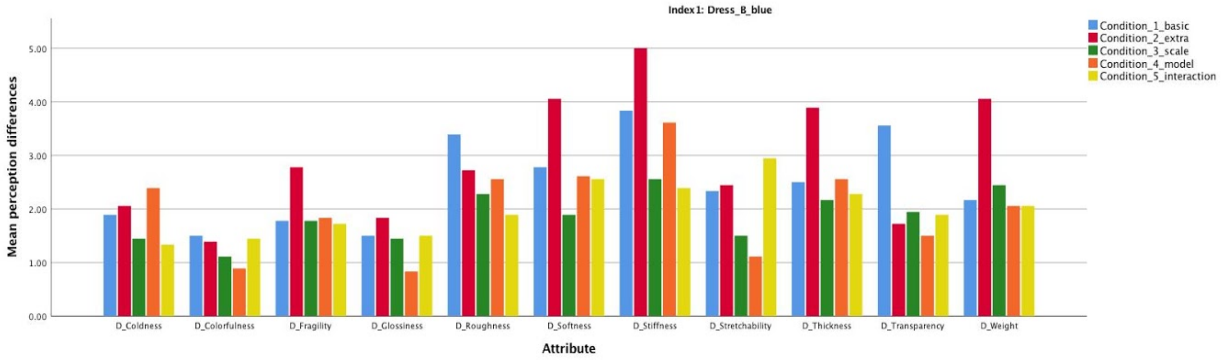


Figure 4.3.3 The means perception differences of 11 attributes for 5 conditions for the dress B-blue

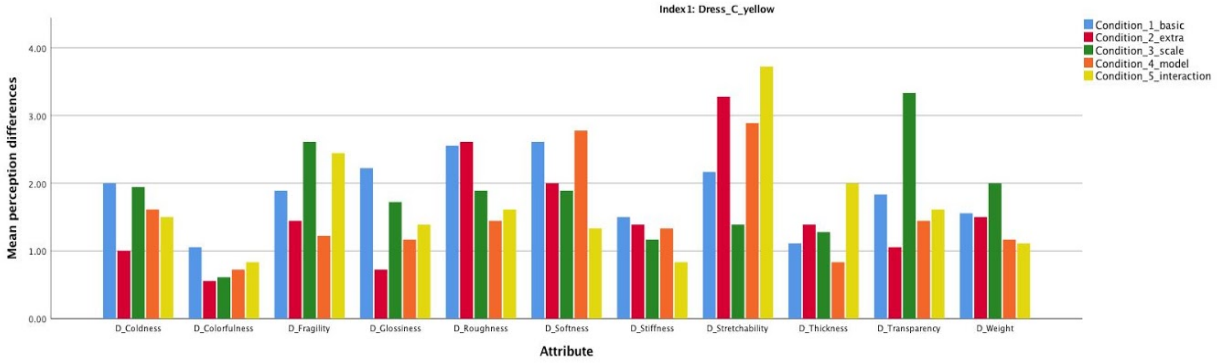


Figure 4.3.4 The means perception differences of 11 attributes for 5 conditions for the dress C-yellow

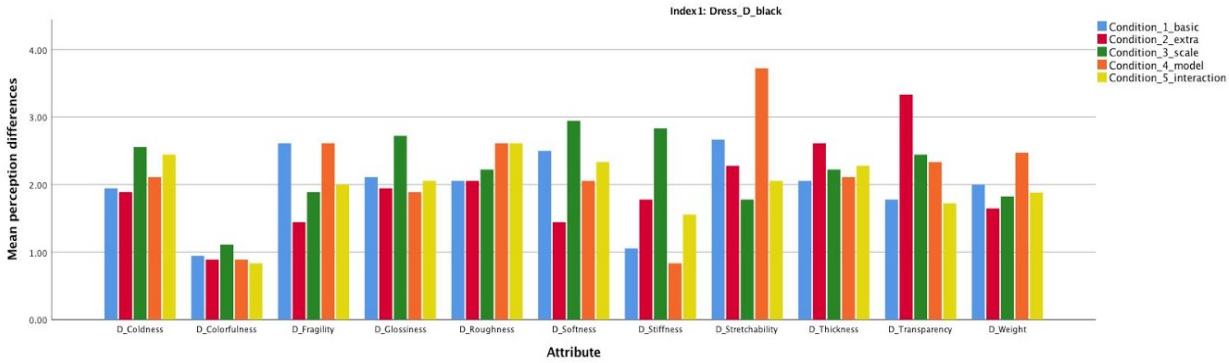


Figure 4.3.5 The means perception differences of 11 attributes for 5 conditions for the dress D-black

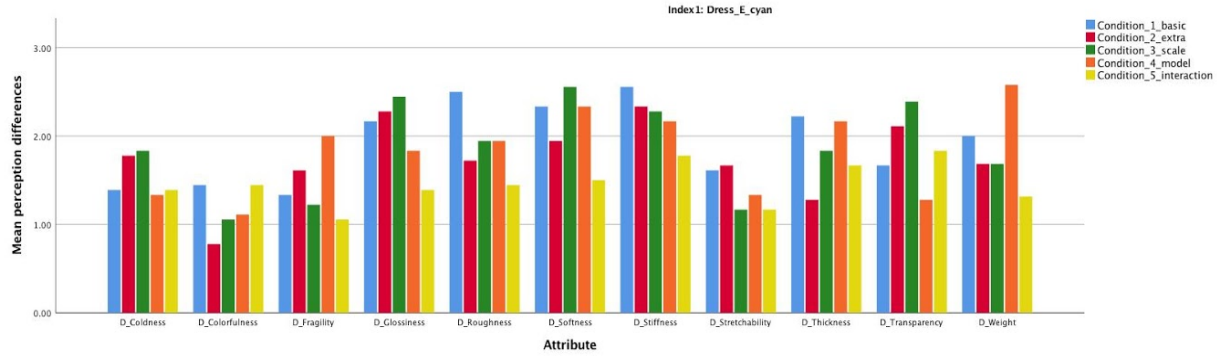


Figure 4.3.6 The means perception differences of 11 attributes for 5 conditions for the dress E-cyan

All the significant results yielding a p-value of 0.1 that are found are reported below, because those results are only used to associate with the qualitative results rather making any conclusions. The reporting of the results is categorized by the dresses.

Dress B-blue

D_stiffness

The mean perception differences of the D_stiffness of the dress B-blue for different conditions are compared, of which the differences could be checked in the figure 4.3.3. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 2-extra and 5-interaction (p=0.004), which indicates that the mean perception differences of the condition 2-extra is statistically higher than the mean perception differences of the condition 5-interaction.

- The result suggests that for the dress B-blue, the condition 5-interaction has positive influences on the perception accuracy of the stiffness comparing with the condition 2-extra.

There are also significant differences between the condition 2-extra and 3-scale (p=0.012), which indicates that the mean perception differences of the condition 2-extra is statistically higher than the mean perception differences of the condition 3-scale.

- The result suggests that for the dress B-blue, the condition 3-scale has positive influences on the perception accuracy of the stiffness comparing with the condition 2-extra.

D_softness

The mean perception differences of the D_softness of the dress B-blue for different conditions are compared, of which the differences could be checked in the figure 4.3.3. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 2-extra and 3-scale (p=0.058), which indicates that the mean perception differences of the condition 2-extra is statistically higher than the mean perception differences of the condition 3-scale.

- The result suggests that for the dress B-blue, the condition 3-scale has positive influences on the perception accuracy of the softness comparing with the condition 2-extra.

D_weight

The mean perception differences of the D_weight of the dress B-blue for different conditions are compared, of which the differences could be checked in the figure 4.3.3. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 1-basic and 2-extra (p=0.100), which indicates that the mean perception differences of the condition 2-extra is statistically higher than the mean perception differences of the condition 1-basic.

- The result suggests that for the dress B-blue, the condition 2-extra has negative influences on the perception accuracy of the weight comparing with the condition 1-basic.

There are nearly significant differences between the condition 4-model and 2-extra (p=0.059), which indicates that the mean perception differences of the condition 2-extra is statistically higher than the mean perception differences of the condition 4-model.

- The result suggests that for the dress B-blue, the condition 4-model has positive influences on the perception accuracy of the weight comparing with the condition 2-extra.

Dress C-yellow

D_Transparency

The mean perception differences of the D_Transparency of the dress C-yellow for different conditions are compared, of which the differences could be checked in the figure 4.3.4. Post hoc tests using the Bonferroni correction reveals that there are significant differences between the condition 2-extra and 3-scale (p=0.002), which indicates that the mean perception differences of the condition 3-scale is statistically higher than the mean perception differences of the condition 2-extra.

- The result suggests that for the dress C-yellow, the condition 2-extra has positive influences on the perception accuracy of the transparency comparing with the condition 3-scale.

D_Thickness

The mean perception differences of the D_Thickness of the dress C-yellow for different conditions are compare, of which the differences could be checked in the figure 4.3.4. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 5-interaction and 4-model (p=0.071), which indicates that the mean perception differences of the condition 5-interaction is statistically higher than the mean perception differences of the condition 4-model.

- The result suggests that for the dress C-yellow, the condition 4-model has positive influences on the perception accuracy of the thickness comparing with the condition 5-interaction.

D_stretchabiliy

The mean perception differences of the D_Stretchabiliy of the dress C-yellow for different conditions are compare, of which the differences could be checked in the figure 4.3.4. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 5-interaction and 3-scale (p=0.074), which indicates that the mean perception differences of the condition 5-interaction are statistically higher than the mean perception differences of the condition 3-scale.

- The result suggests that for the dress C-yellow, the condition 3-scale has positive influences on the perception accuracy of the stretchability comparing with the condition 5-interaction.

Dress D-black

D_Stifiness

The mean perception differences of the D_Stifiness of the dress D-black for different conditions are compared, of which the differences could be checked in the figure 4.3.5. Post hoc tests using the Bonferroni correction reveals that there are nearly significant differences between the condition 3-scale and 1-basic (p=0.090), which indicates that the mean perception differences of the condition 3-scale are statistically higher than the mean perception differences of the condition 1-basic.

- The result suggests that for the dress D-black, the condition 3-scale has negative influences on the perception accuracy of the stiffness comparing with the condition 1-basic.

Summary of the results

The results of the section 4.4 and the section 4.3 are associated together and summarized below.

For the dress B-blue

- The condition 2-extra has negative influences on the perception accuracy of the weight comparing with the condition 1-basic.
    - Because the weight is influential to the impression of the material matching for the dress B-blue, the condition 2-extra has negative influences on having the correct impression of the material matching.
- The condition 4-model has positive influences on the perception accuracy of the weight comparing with the condition 2-extra.
    - Because the weight is influential to the impression of the material matching for the dress B-blue, the condition 4-model has positive influences on having the correct impression of the material matching comparing with the condition 2-extra.
- The condition 5-interaction and the condition 3-scale both have positive influences on the perception accuracy of the stiffness comparing with the condition 2-extra.
    - Because the stiffness is influential to the impression of the material matching for the dress B-blue, condition 5-interaction and the condition 3-scale both have positive influences on having the correct impression of the material matching comparing with the condition 2-extra.
- The condition 3-scale has positive influences on the perception accuracy of the softness comparing with the condition 2-extra.

For the dress C-yellow

- The condition 2-extra has positive influences on the perception accuracy of the transparency comparing with the condition 3-scale.
- The condition 4-model has positive influences on the perception accuracy of the thickness comparing with the condition 5-interaction.
- The condition 3-scale has positive influences on the perception accuracy of the stretchability comparing with the condition 5-interaction.
    - Because the stretchability is influential to the impression of the material matching for the C-yellow, the condition 5-interaction has positive influences on having the correct impression of the material matching comparing with the condition 3-scale.

For the dress D-black

- The condition 3-scale has negative influences on the perception accuracy of the stiffness comparing with the condition 1-basic.

4.5 Presentation review of the scale references

The presentation review form is filled out by the participant to get their feedback on the presentation method of the reference scales. Because some participants didn't fill out the presentation review form, only 70 responses of participants' reviews are reported and illustrated with graphs.

The first question, "Do you like the input from fabric experts or other consumers?", is presented in the figure 4.5.1. It is clearly seen from the figure that around 85.7% responses express a positive opinion, which consists of the 22.86% "slightly like", the 41.43% "quite like", the 20% "very like" and the 1.43% "extremely like".

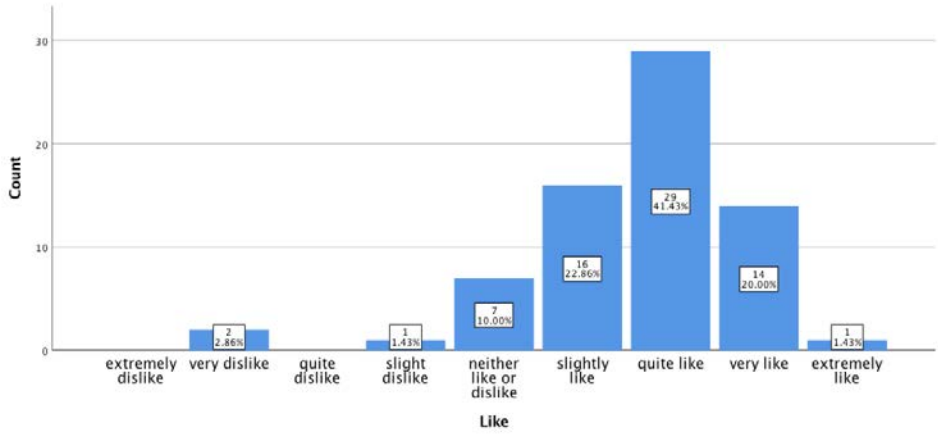


Figure 4.5.1 The result of the question:
Do you like those input from fabric experts or other consumers?

The second question, "Do you think this presentation is useful for your material perception?", is presented in the figure 4.5.2. It is clearly seen from the figure that around 91.4% responses consider the presentation method of scale references is useful, which consists of the 31.43% "slightly useful", the 37.14% "quite useful", the 20% "very useful" and the 2.86% "extremely useful".

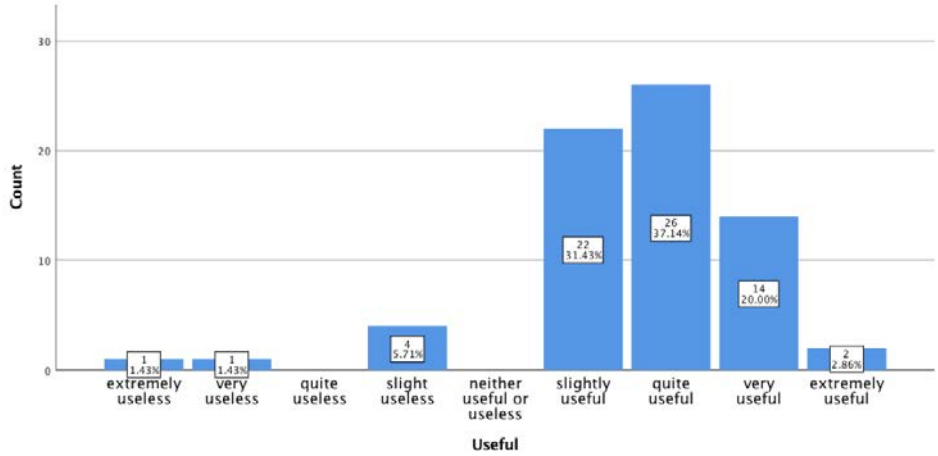


Figure 4.5.2 The result of the question:
Do you think this presentation is useful for your material perception?

The results of the third question, “What other scales do you think are missing?”, are only filled by 18 participants. Some responses are not related with the material, so those responses are not included. All the related responses are organized and presented in a question form at below:

- How matching is the online presentation with the real product? (2 responses)
- How easily does the fabric become wrinkled? (2 responses)
- How easily does the fabric have polling problem? (1 responses)
- How easily does the shape change after the washing? (1 responses)
- How easily does the fabric color fade? (4 responses)
- How good does the fabric keep warm? (2 responses)
- How breathable the fabric is? (2 responses)
- How heavy the fabric is? (2 responses)
- How glossy the fabric is? (3 responses)

4.6 Qualitative data analysis

The qualitative data analysis, which consists of 12 interviews, was conducted in 2 stages.

- In the first stage, 12 interviews were transcripted.
- In the second stage, transcriptions were coded, organized and categorized according to the research purposes, which is getting deep understandings of effects of each presentation method and perceived information from different presentation methods.
- After analysing the transcriptions, the insights were reported and further interpreted with the results from the quantitative data analysis.

4.7 Results and summary

4.7.1 Demographic report

Totally 12 participants are conducted the semi-structured interview, and at least 2 participants are recruited for giving feedback of all 5 dresses in 5 conditions. The 12 participants are all master students of TUD. The nationality of the participants is clearly reported in the figure 4.7.1.

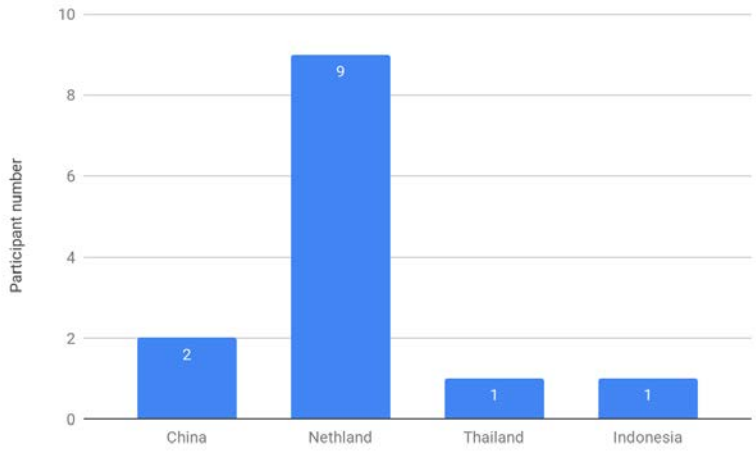


Figure 4.7.1 The count of the participant nationality

4.7.2 Summary of the insights

After transcriptions are coded, organized and categorized according to the research purposes, all the insights interpreted from the transcriptions are summarized in this section.

The summary of the insights with original quotations could be viewed in the appendix. E

A. General perception

What leads the impression of the fabric?

The wrong perceptions are easily caused by previous experience of viewers

- Personal expectation or judgement of the fabric
    - The participant immediately builds the judgement on the type of the viewing fabric after quickly scanning all the presentations, which leads wrong way of fabric perception.
- Previous experience of accessing the similar fabric
    - The participant directly relates the viewed dress to the similar dress viewed before, which result in the wrong judgement.
- Impression from the previous viewed presentation
    - The participant has strong impression on certain viewed presentation, which makes the participant make the wrong judgement and it is hard to be changed.

Influential factors for perceptions

From the visual perspective, certain factors are possible to lead viewers to the previous experience

- The type of the dress
    - If the certain features of the dress were conflicting with the type pf the dress, the viewer would make assumptions based on the imagination of the type of the dress
        - The viewer would interpret the “rough and thin jeans” as “rough and thick jeans”, since most of the jeans fabric is rough and thick
- The texture of the fabric
- The interactions between the fabric and the human body
    - Collarband
    - Wristband
    - Waist
- Drapes and wrinkles of the presented dress

Some features of the fabric are hard to see from the existed presentations, but they are influential

- The back side of the fabric
- The lining of the product
    - Highly related with the estimation of the thickness and the fabric weight. The fabric weight is hard to be distinguished from the product weight

Some external factors are influential in the understanding the fabric

- Lighting have strong influences on the perception of the glossiness in certain type of fabric (Dress C-yellow and Dress D-black)
- Product price directly influences the expectation of the fabric

The impression for each dress

Dress A-olive

- With material knowledge of the jersey, the wrong perception goes to the very thin fabric.
- Without the video, the impression of the dress is thin, light, fragile and shiny, which looks like a normal T-shirt.
- With the video, the impression of the dress is thick, stiff and shiny.
- The overestimated glossiness is caused by the lighting
    - The studio lighting，which is in white, is not suitable for presenting this dress
- The perception of thickness, glossiness and fragile is easy to be wrong

Dress B-blue

- The general impression of the dress B-blue is a rough jeans dress.
- Without the video, the impression of the dress is thick, stiff.
- With the video, the impression of the dress is limp, and it is shiny.
- The perception of thickness, roughness, stretchability and stiffness is prone to be wrong

Dress C-yellow

- The general impression of the dress C-yellow is a soft, thin dress without stretchability.
- The perception of thickness, stretchability and glossiness is easy to be wrong.
- The pattern makes the surface of the fabric feel rougher than it should be.

Dress D-black

- The general impression of the dress D is diverse and different in thickness, stiffness, stretchability and glossiness.
- The black color makes the details of the dress hard to be perceived.
    - Missed details make it hard for participants to correctly understand the type of the dress
- The perception of thickness, stiffness, stretchability and glossiness is likely to be wrong.

Dress E-cyan

- The general impression of the dress E is a stiff dress.
- The perception of thickness, stiffness and roughness is easy to be wrong
    - The structure (white lines) on the surface of the fabric is confusing, which might influence the perception of thickness, stiffness and roughness.
- The zip on the back of the product is hard to be perceived, which influences the understanding of the type of the dress

Missing information about the dresses

- How to iron
- Detailed description of lining
    - The position of the lining
    - The thickness of the lining
    - The type of the fabric of the lining (same or different from the outside layer)

B. Presentation methods

General preference of the presentation

- The video of model and the video of hands interacting are preferred comparing with the extra detailed material photographs or scale references.
- For understanding the fabric, the video of hands interacting is more useful compared with the video of model.
- For triggering viewers' interests and purchase desire, the video of model is preferred compared with the video of hands interacting.
- The extra detailed material photographs or scale references

    - If viewers preferred visual information, they would think the scale references is too many.
    - If viewers looked for certain characteristics or attributes of the fabric, they would prefer the scale references.

Photographs

General opinion about the product photographs and the photographs of model wearing the product

- Compared with the product photographs, the photographs of model wearing the product is more informative and preferred.

Opinion about the product photographs

- Positive opinions about the product photographs
    - looks more realistic
- Negative opinions about the product photographs
    - Too flat
    - Not informative for the black color dress (Almost no details are perceived)

Opinion about the photographs of model wearing the product

- Positive opinions about the photographs of model wearing the product
    - More informative compared with the product photographs, because it shows the interactions between the fabric and the body. It makes viewers imagine more fabric movement, which is better for the understanding of material.
- Negative opinions about the photographs of model wearing the product
    - More informative means higher possibilities of wrong assumption

Opinion about the detailed material photograph

- Positive opinions about the detailed material photographs
    - Informative for the pattern or structure of the fabric
- The detailed material photographs may lead to wrong assumptions of the fabric
    - The size of the photograph is hard to estimate, and the close view of the texture might lead to the wrong perception of the roughness, which could cause the wrong assumption of the type of the fabric

Textual information

- Few participants subjectively skip the important information related with the fabric.
    - Participants do not care about the textual information because they do not like reading or they think it is time-consuming and useless
    - Participants think that information have few inspirations for them
    - For certain fabric, participants do not understand the exact meaning of the material information. (For example, for the dress B-blue, the “100% Lyocell” does not have any practical meanings for most of viewers because they do not know this material)
    - Skip important information, such as lining, which might lead to the wrong perception of thickness and weight
- Opinion about the machine washing
    - Information of washing temperature is useful and needed
    - The fabric is not too fragile, which does not need the extra caring.
- The participants directly look for certain information and skip others

Scale references

- Information getting from the photographs are more convinced and preferred compared with the information getting from the scale references

- The scale references are more useful for the attributes that are hard to perceive from the photographs
    - Thickness
    - Transparency
    - Stretchability
- Positive opinion
    - Informative and precise
- Negative opinion
    - The scale references are useful and interesting, but they are hard to read. The better style and visualizations are needed.

The extra detailed material photographs

- Positive opinion
    - Rich information about the texture, which would be commercially successful.
- Negative opinion
    - The photographs of the stretched fabric is hard to understand

Videos

- Both videos in the same time are preferred because they provide complementary information of the fabric
- Videos are more informative than the photographs, which is better for understanding the material as it explains more about different views, fabric movements and dynamic interactions between fabric and the body.
- Positive opinions about the video of hands interacting
    - Better for understanding the material compared with the video of model, because it shows more aggressive movements about the material, which provides rich information for the fabric itself.
    - More useful for certain attributes, such as thickness, softness and roughness.
- Negative opinions about the video of hands interacting
    - People would not interact with the fabric in this way in reality, and they care more about how they look like when they are wearing the dress.
    - Certain actions in the video looks confusing and useless (Twisting the fabric)
- Positive opinions about the video of model
    - Better for viewers to imagine how they look like when they are wearing the dress
- Negative opinions about the video of model
    - Hard to imagine yourself from the model

Perceived information from the presentations

- Product photographs
    - Most information is overlapped with the photographs of model wearing the product
- Photographs of model wearing the product
    - Interaction between the dress and body, for example the arm, the back and the waist, where the skin can be viewed
    - Comparing with the skin color of the model is helpful for understanding the fabric color
    - How is the dress sewed?
- Textual information
    - Confirm Information about the color and the familiar fabric
    - Look for certain fabric
    - Lining (Sometimes skipped)
    - Description of the fabric, such as smoothness

    - Caring information
    - Viewers are sensitive about the elastane information, but hard to estimate it without references
    - Lacking understanding or knowledge of the fabric
- Extra detailed material photographs
    - Rich information about the texture
    - Access stretchability for certain types of dresses (Dress D-black)
    - Thickness from the edge of the fabric
- Detailed material photographs
    - Texture of the fabric
    - Estimate the method of knitting fabric, then imagine the stretchability
    - Perceive the information or type of the pattern, but it might not be precise
    - Judge the type of the fabric based on the detailed texture, for example, jeans
    - Image the roughness of the surface
- Video of model
    - Directly build the impression of the the type of the fabric
    - How it fit the model
    - Model moving shows more angles of the dress and the changes of the lighting, which is good for access the color and the glossiness.
    - Perceive the transparency from the revealed bra (Only dress C-yellow)
    - Feeling of the fabric flowing
- Video of hands interacting
    - Estimation on the weight of the fabric based on big range movements
    - Really helpful for understanding the stiffness and the softness of the fabric

- Un-matching information among different presentations makes viewers confused, then they would follow their first impression or the previous similar experience of the fabric

C. Attribute perception

Influential attributes

The certain attributes of the fabric are more influential when viewers perceive the material, or they consider more about these specific attributes, which means those attributes are more influential on their judgements of the fabric.

- Thickness
    - Thickness is the starting point of the fabric estimation
- Softness
- Stiffness
    - The stiffness is associated with the drapes and the wrinkles of the fabric
- Glossiness
    - The glossiness directly influences the perception of the color, because the reflection of the lighting could change the feeling about the color.
- Transparency
- Fragile
    - The fragile could be estimated from the caring information, which influences the perception of product durability.
- Stretchability
    - The stretchability influences the estimation of how dress fit the body.

How viewers perceive each attribute

- Coldness
    - Imagination based on the the type of the fabric
- Fragile
    - Link to the clothes pilling

    - Imagination based on the the type of the fabric
    - Link to stretchability
    - Interpreted from the caring information
- Glossiness
    - Based on the pattern of the fabric surface
    - Based on the reflection of the lighting
- Roughness
    - Imagination based on the the type of the fabric
    - Based on the pattern
    - Based on the textual information of description of the fabric
- Softness
    - Imagination based on the the type of the fabric
    - Based on the interactive feedback of the fabric, such as squeezing
- Stiffness
    - Imagination based on the type of the fabric
    - Based on the shape of the dress (Loose or tight)
    - Based on the drapes and wrinkles of the fabric
- Stretchability
    - Imagination based on the type of the fabric
    - Based on the pattern
    - Based on the knitting method
    - The wrinkles on the photographs
- Thickness
    - Imagination based on the the type of the fabric
    - The wrinkles on the pictures
    - Link to the stiffness
    - Based on the sewing
    - Imagination based on the fabric movement
    - Based on the back side of texture
    - The edge of the dress
    - Imagination based on the knitting method
- Transparency
    - Wrong estimation because of missing the information about lining
    - Imagination based on the type of fabric
    - Put fabric under the light
    - Imagination based on the border of wristband or neckband where a part of the skin is slightly revealed
- Weight
    - Wrong perception caused by missing the information about lining
    - Imagination based on Interactions between the fabric and the body (Model catch the dress)

Influences between attributes

Imagine from the thickness

- Roughness
- Softness
    - The thicker fabric with elasticity makes it feels softer
- Transparency
- Stiffness
- Weight
- Fragile

Imagine from the roughness

- Fragile
    - The rough material has high density, which makes it feels less fragile

Imagine from the stretchability

- Fragile
    - Opinion: The stretchy fabric is easy to break
    - Opinion: If the fabric could be stretched a little bit, it will not be broken easily.
- Transparency
    - The fabric could be seen through when stretching it out

Associate together

- Stiffness and roughness
- Stiffness and weight
    - Stiffness means high density, which influences the weight of the fabric

The fabric weight is hard to be isolated from the product weight

Hard to perceive

- Thickness
- Stretchability
- Weight
- Coldness
- Stifiness

Considerations for purchasing dresses

- Visual preferences
    - Colorfulness / color matching
    - Glossiness (Personal preference)
    - Transparency (Personal preference)
- Thickness
- Stretchability
    - Fit the body (Size)
- Comfortableness
    - Softness
    - Stifiness
    - Breathability (In summer)
- Style
- Certain type of fabric
- Machine washable
    - How hard to care
- Price
    - Estimate the dress from the price
    - Look for the cheaper dress in the similar appearance

D. Improvement for the presentation method

Photographs

- Present product in special conditions
    - Put flat on the table or hang on the wall, which gives different feelings to the viewers comparing with the photographs of the model wearing the product
    - Provide the photographs in sitting condition
- Provide the photographs in multiple lighting conditions
    - Show the photographs in different lighting situations, such as sunlight, warm indoor light, cold indoor light.
- Highlight the intricate and confusing attribute of the fabric
- Provide the photographs of the back side of texture
- The close-up view is better to follow the hanging position of the mouse

Textual information

- Temperature of washing
- The position of the lining

Detailed material photographs

- Describe the size of the cropped area of the fabric. For example, one square decimeter.

Extra detailed material photographs

- Add a side view of folded fabric to present the thickness and stiffness of the fabric.
- Give more illustrations of the stretched fabric photographs, such as big hand movements and arrows showing the moving direction.

Scale references

- Less amount of the scale segmentations. For example, for the stiffness, only provide 5 segmentations of the scale: very limp, quite limp, normal, quite stiff, very stiff
- Better visualized (Iconized attributes or concepts)
- Provide a referenceable and familiar fabric to compare.
- More distinctive attribute segmentation.
- Missing attribute
    - Glossiness
    - Fragile
    - Flowing

Video of the model wearing the product

- Show a position of sitting on the chair
- More aggressive movement

Video of the hands interacting with product

- Stretch or squeeze the fabric slowly
- Show more about transparency
    - Put the fabric under the light
- Use a hanger to present

5. Discussion

In this chapter, the results from the quantitative data analysis as well as the summarized insights from section 4.7 are discussed and interpreted together. This was in order to build deep understanding on material perception of online apparel shopping.

5.1 Discussion about the perception of the attributes

In the experiment, 11 attributes are used to describe and measure the perception of the viewed product. The products, which are 5 different dresses, are viewed by photographs or videos and also checked physically. It is interesting to ask how people perceive those attributes, how precise the perception of those attributes are, and what considerations they have when they perceive those attributes. On the other hand, the relations between of the impression of each attributes are summarized based on the insights from the interviews.

5.1.1 Explore the perception differences of the attributes

Because the perception differences of each attribute could be used to infer the perception accuracy, the mean perception differences of 11 attributes are compared and presented in figure 5.1.1. In the figure, the lower mean perception differences indicate more accurate perception of the corresponding attributes.

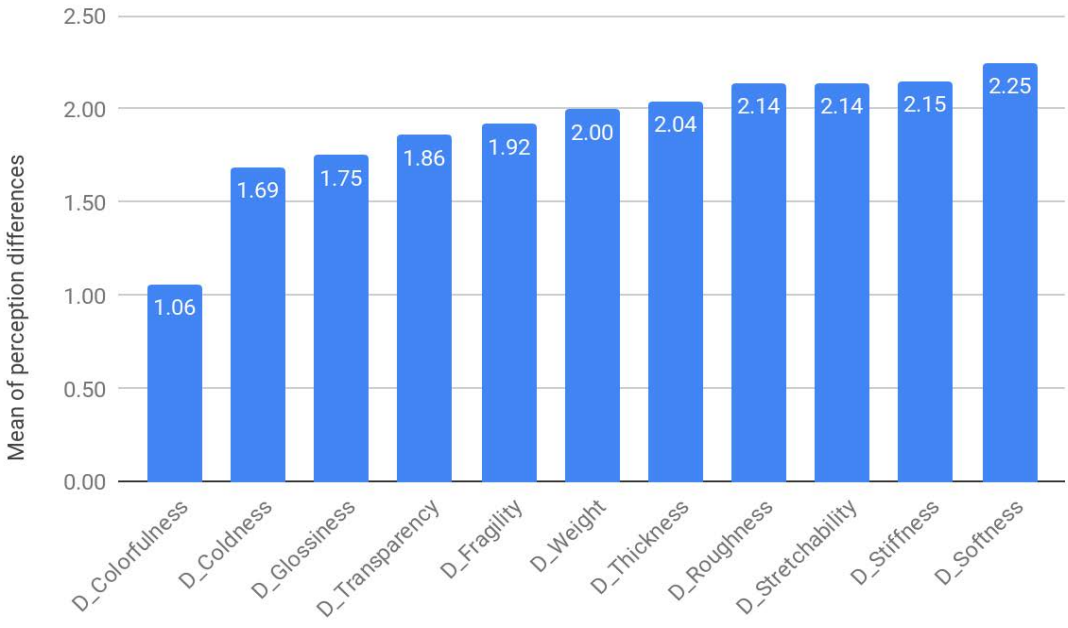


Figure 5.1.1 Mean perception differences in the ascending order

In order to statistically see the differences between attributes, Post hoc tests using the Bonferroni correction is conducted, which reveals that there are significant differences between the D_Colorfulness and all other attributes (p=0.000). There are also significant differences between the D_Coldness and the D_Stiffness (p=0.060), the D_Coldness and the D_Stretchability (p=0.021), the D_Coldness and the D_Roughness (p=0.000), the D_Coldness and the D_Softness (p=0.000). There are also significant differences between the D_Glossiness and D_Roughness (p=0.036), the D_Glossiness and the D_Softness (p=0.003).

On the other hand, it also meaningful to see the correlations between attributes, which is helpful to understand the considerations when they perceive those attributes. Consequently, a Pearson product-moment correlation coefficient is conducted to assess the relationship between perception differences of the attributes, which is visualized in the figure 5.1.2. Only the results yielding a p-value of 0.001 are shown in the figure. The r with value over 0.4 is highlighted in red; the r between 0.4 and 0.2 is highlighted in orange; the r between 0.2 and 0.1 is highlighted in green.

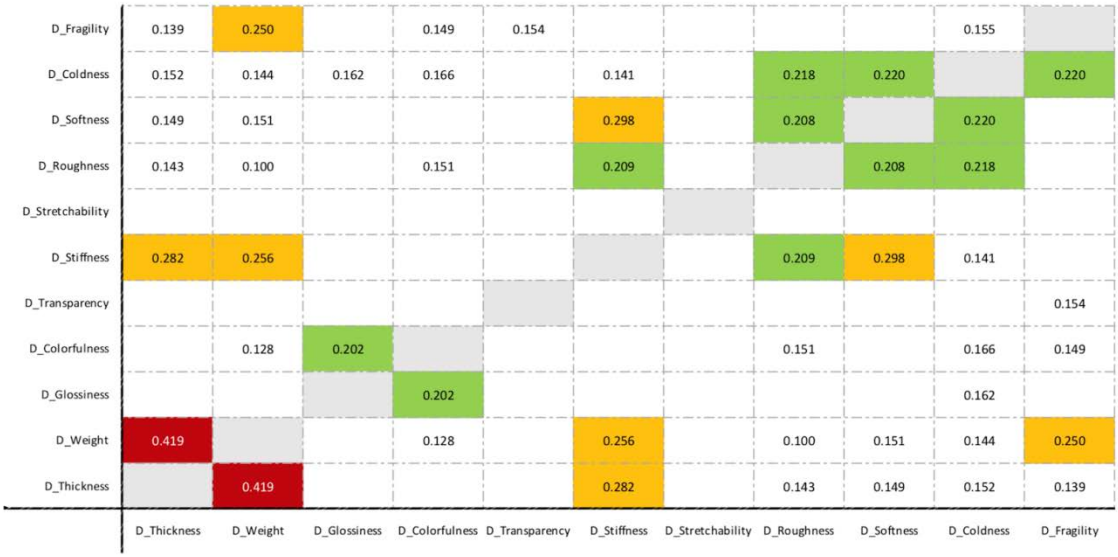


Figure 5.1.2 Correlation between perception differences of the attributes

5.1.2 The difficulty and ambiguity of perceiving the attributes

Based on the results from the section 5.1.1, the difficulty and ambiguity of perceiving the attributes are discussed in this section.

Difficulty of perceiving the attributes

First of all, the result statistically indicates that the perception accuracy for the colorfulness is the highest. This is easy to understand since the color of the fabric could be directly and visually perceived from the visual stimuli. It is not surprising to see that the perception differences of the colorfulness have correlations with the glossiness (r = 0.202), because the glossiness could also be directly perceived from the visual stimuli. According to the insight from the interview, "the glossiness directly influences the perception of the color, because the shiny reflection of the lighting could change the feeling about the color" and "The lighting has big influences on the

perception of the glossiness in certain type of fabric (Dress C-yellow and Dress D-black)". It could be interpreted that the lighting influences the attributes perceived from the visual stimuli.

Although the transparency is similar as the colorfulness and the glossiness directly perceived from the visual stimuli, it does not have correlations with them. It is interesting to understand from the insights about how the transparency is perceived and how perception differences of the transparency are made. Take three quotes for example, "Imagination based on the type of the fabric", "Imagine based on the border of wristband or neckband where a part of the skin is slightly revealed" and "put the fabric under the light". This indicates that the transparency of the fabric is hard to present well since the viewers need to judge it based on their imagination of other things related to the fabric.

Secondly, the perception differences of the thickness and the weight have distinctively higher correlations comparing with other attributes ($r = 0.419$). This is easy to understand since thicker fabric is normally heavier. However, this association does not hold when the information regarding the lining is unnoticed or unclear. More specifically, if the viewers missed the information of lining, they might still perceive the correct information of the thickness, but the perception of product weight could be wrong. According to the insight, "the fabric weight is hard to isolate from the product weight", the viewers would think the fabric is much heavier than they thought, because the dress feels heavier without knowing about the existence of the lining. Although this feeling is not caused by the perceived fabric, the viewer is still influenced by the weight of the lining.

It is clearly evident from the figure 5.1.2 that, although the correlation is not strong, the perception differences of the thickness and the weight are correlated with many other attributes, such as the stiffness, roughness, softness and fragility. This result corresponds with the insight, "The thickness is the starting basement of the fabric estimation". Moreover, the perception differences of the stiffness, roughness and softness are associated with each other ($r = 0.209$ between D_Roughness and D_stiffness, $r = 0.298$ between D_Stiffness and D_Softness, $r = 0.208$ between D_Roughness and D_Softness). According to the insights of perception attributes, "Stiffness and roughness are associated together" and "The roughness and the stiffness are imagined from the type of the fabric", it is not hard to conjecture why their perception differences influence each other.

Thirdly, because of the insight, "the fragility and coldness are imagined by the type of the fabric", it is understandable that the correlations exist between the perception differences of the fragility and the weight ($r = 0.250$), the fragility and the coldness ($r = 0.220$), the coldness and the roughness ($r = 0.218$), the coldness and the softness ($r = 0.220$). That is because the softness and the roughness are all related with the type of the fabric.

Lastly, it is not hard to find that the perception differences of the stretchability have no correlations with other attributes. According to the insight, "The stretchability influences the estimation of how dress fit the body.", it could be interpreted that the stretchability is related with the acceptable tolerances of the dress in the physical aspect. This is a distinctive aspect of purchasing considerations comparing with other attributes.

In this way, from the consumer perspective, based on the above discussion and the insights (C. Attribute perception in section 4.7.2), the perception of these 11 attributes could be generally interpreted into 4 aspects of considerations when consumers are shopping clothing online.

For the first aspect, the transparency, the colorfulness and the glossiness belong to the visual preferences for purchasing the dress. According to the insights of considerations while purchasing dresses, visual preferences is the top line purchasing motivation, making it highly influential to the business success.

For the second aspect, the stretchability is related with the acceptable tolerances for purchasing the dress. One insight mentions that it is hard to judge the fitting of the dress from the model or another person. From this point of view, the stretchability provides more tolerances for the dress to fit the persons who have different body types.

For the third aspect, based on the previous research about the comfort dimension (Kamalha, E., Zeng, Y., Mwasiagi, J. I., & Kyatuheire, S., 2013) the softness, the stiffness, the roughness and the coldness are associated with comfort of the clothing. It is mentioned before that those attributes could be perceived by imagining the type of the fabric used, but they are highly related with the tactile perception. This means that the tactile perception relies on imagination from the visual perception. This makes the perception of those attributes difficult, because if the consumer made the wrong judgement on the product type based on a part of the attributes of the fabric, they would make the other perception wrong.

Fourth, the fragility is related with the durability and the caring of the fabric, which is interpreted from the insight, "the fragility is interpreted from the caring information" and "if the dress is washable, it is strong enough". It is not necessary for the summer dresses having long durability, which suggests that the fragility is not an important consideration of the dress. However, it might be a very important point for more functional clothing products.

Ambiguity of perceiving the attributes

However, although the interpretations from the consumer perspective are clear and easy to understand, it become complicated when we need to perceive those attributes and use them to interpret purchasing demands and personal preferences.

For example, the stiffness is related with the third aspect regarding the comfort of the clothing, since it could be understood that stiff and hard fabric makes people uncomfortable. This attribute could be perceived from the drapes and the wrinkles of the fabric and it also have influences on drapes and the wrinkles. This makes this attribute relate to the aspect of visual preferences. On the other hand, since the stiffness of the fabric has influences on drapes and the wrinkles, it also remind the viewer that the fabric might become wrinkled and it need to iron, which is related with the durability and the caring of the fabric.

The thickness plays multiple roles on influencing the perception of the fabric. Particularly, it has influences on the perception of the weight, the roughness, the softness, the transparency, the stiffness, the weight and the fragility. But it is very easy to be wrongly perceived, because of the insights, "the thickness is perceived from the wrinkles, the edge of the dress and the type of the fabric". Those perception judgements are not reliable, because it can be due to reasons such as the edges of the fabric having multiple layers sewing together and so on.

Last but not least, regarding perception of the fragility and the weight, it is hard to find any references from static photographs. The judgement is mainly based on the interpretation and imagination from the other attributes, which make the perception of the fragility and the weight easy to deviate from the fact.

(More insights of the perception of the attributes could be viewed in the section 4.7.2.)

On the whole, in this study regarding the general perception of the material in the clothing online shopping situation, the perception is not an action without purposes and preferences. According to the insight, "The wrong perceptions are easily caused by previous experience of viewers", the consumers' judgement is highly based on the immediate impression that they have when they see the fabric on photographs. In other words, what consumers think is more

influential than what they see. Therefore, understanding what consumers exactly consider about the fabric when they search online is essential.

5.1.3 The relations of impression of the attributes

During the interview, the participants are asked to explain how they perceive each attribute and how one perception influences another one. When the impression of one attribute was built, it would influence the impression of another attribute.

According to those insights from the interviews, the relations between the impression of two attributes are summarized in the figure 5.1.3. To be clear, this is not related with the perception differences. Only if the relation between the impression of two attributes is mentioned over 2 times in the quotations transcripted from the interviews, it would be presented in the figure 5.1.3.

This summary could be used to work as references to explain perception differences of the attribute. For example, when a fabric looks thick, viewer would also think it is rough. However, it is actually a smooth fabric. Then, this conflicting impression leads to the perception differences. However, this summary is only generated based on the insights from this research, so it is not proven by the statistical results.

The explanation of the figure 5.1.3

If the attribute were shown in the left part of the figure, it means that the impression of this attribute could influence the impression of the attribute that linked with an arrow line. The up and down arrow is used to describe the change of the impression. The definition of the attribute could be checked in the section 3.4.4.

The figure is interpreted from the left to right. It describes that how the impression of the attribute in the left side of the figure influence the impression of the attribute in the right side of the figure. The up and down arrows describe the change of the impression. For example, if the impression of the thickness became thicker, the impression of the stretchability would be less stretchy.

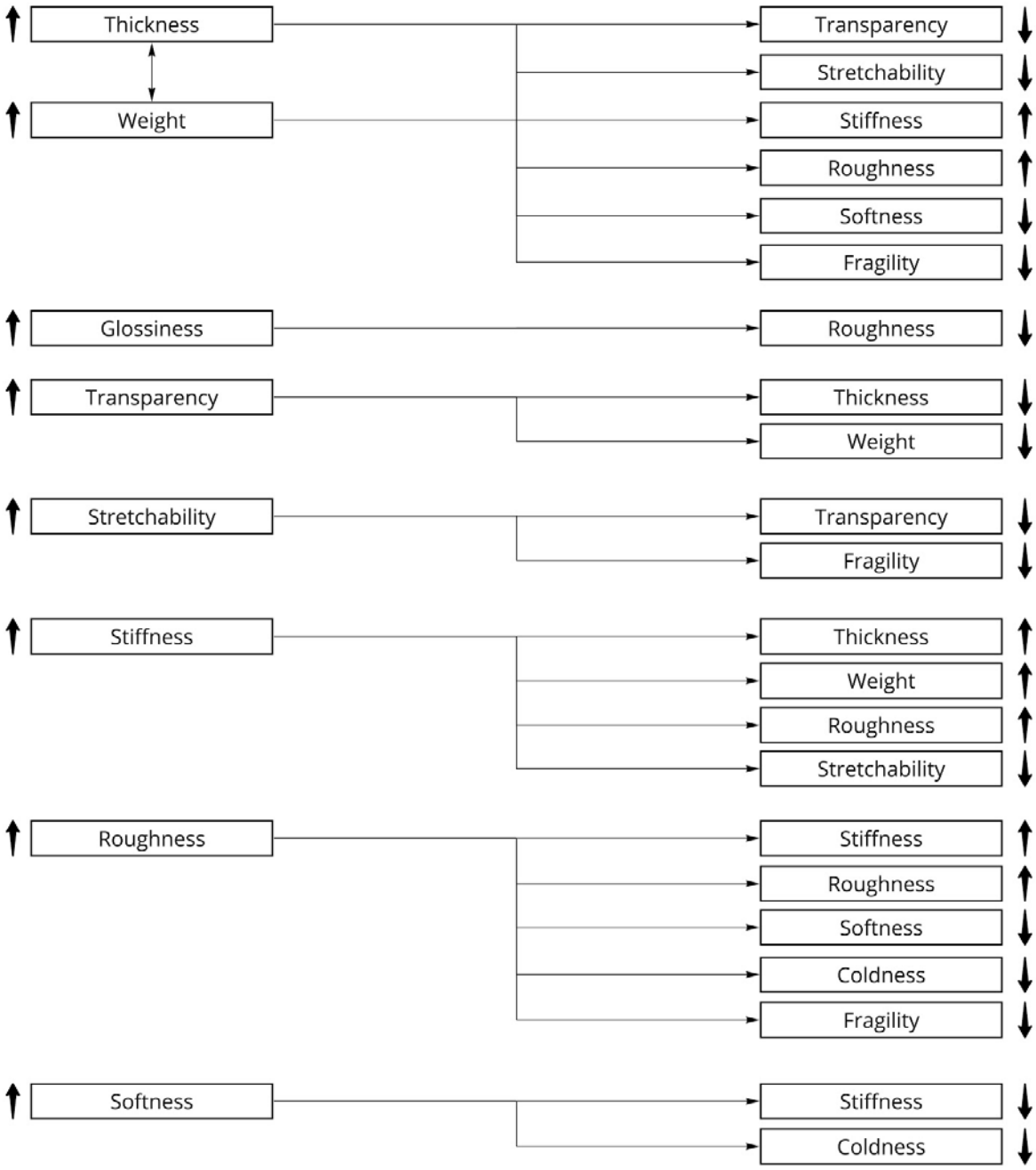


Figure 5.1.3 The relations of the influences between the impression of two attributes

5.2 Discussion about the influences of each dress on the material perception

Based on the result from the analysis in the section 4.2.3, it is statistically clear that the 5 dresses have influences on the perception of the attribute. Therefore, the characteristic of each dresses is discussed relative to the 11 attributes in this section.

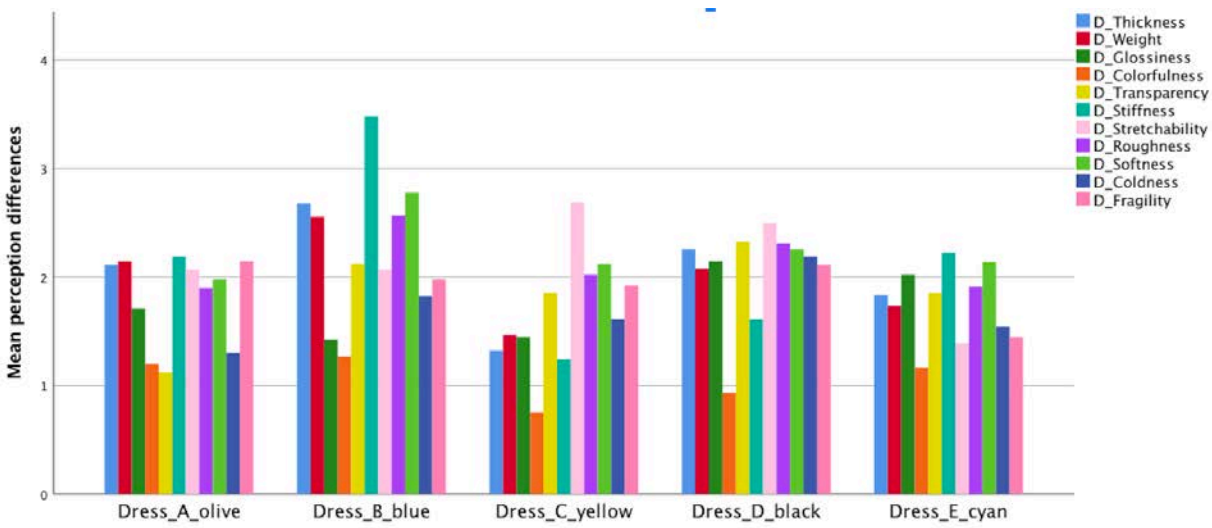


Figure 5.2.1 The mean perception differences of each attribute categorized by the 5 dresses

The figure 5.2.1 illustrates the mean perception differences of each attribute categorized by the 5 dresses. It is clearly seen in the figure that the mean perception differences of a few attributes vary considerably among 5 dresses, which provides an overview about the perception accuracy for each attribute in each dress. The higher mean perception differences indicate the perception accuracy of this attribute is lower.

According to the analysis in the section 4.3, certain attributes are more influential to the impression of the material matching and the color matching.

The influential attributes for each dress are discussed together with the insights (in the section 4.7.2) associated with the color matching in the section 5.2.1 and the material matching in the section 5.2.2. The stimuli of 5 dress could be checked in the website:
https://www.jingliang-shen.design/stimuls

5.2.1 The color matching

From the color matching perspective, the perception differences of the colorfulness and the glossiness are influential for all 5 dresses, especially for the colorfulness. This is easy to understand, because the colorfulness and the glossiness are directly related with the impression of the fabric color.

In terms of the dress A-olive, the general impression about the fabric is shiny. The reason is that the fabric has ability to reflect the light. Because the lighting for making stimuli is harsh and white, which makes the dress shiny. But the fabric in reality feels duller compared to the stimuli.

This different feeling of the glossiness also influences the perception of the colorfulness. More specifically, the color of the dress looks lighter in stimuli than it looks in real. Therefore, it is not hard to understand the result shown in the section 4.3 that the perception differences of the glossiness influences the impression of the color matching most. That is because the perception differences of the glossiness caused by the harsh studio lighting is the most unacceptable issue for the dress A-olive according to the insight on impression of the dress.

In terms of the dress B-blue, the perception differences of the roughness seem the most influential reason for the impression of the color matching. The main reason is that the fabric resembles very rough jeans, but it is not. Because of this, the fabric does not feel shiny and the color seems dark. In reality, the dress B-blue looks shiny and the blue color is not that dark compared to the stimuli. Correlating with the result in the section 4.2.3, the dress B-blue has the lowest mean score for the color matching, which indicates the strong influences of the wrong judgement of the type of the fabric.

In terms of the dress C-yellow, the perception differences of the colorfulness and the glossiness are equally influential to the impression of the color matching. Additionally, for dress C-yellow, it is also the only dress that has printing patterns on the surface. The patterns are the main reason for the perception differences of the glossiness, since the patterns make the dress look shiny under the harsh and white studio lighting. Because of this, the perception differences are also influenced by the glossiness.

In terms of the dress D-black, it has the highest mean score for the impression of the color matching, which is easy to understand since it is black. However, according to the insights, since the dress D-black is shiny, it looks grayish under the harsh and white studio lighting.

In terms of the dress E-cyan, the perception differences of the colorfulness are influential to the impression of the color matching. Based on the insights, the color of the dress E-cyan looks different in the real dress and stimuli, because the dress has some white lines on the surface, which looks shiny under the harsh and white studio lighting.

In conclusion, there are two influential factors for the color matching. One is the surface texture of the fabric, such as very rough texture that reminds viewers of certain type of the fabric. The other one is the harsh and white studio lighting.

5.2.2 The material matching

From the material matching perspective, 7 attributes are influential for all dresses. They are namely the stretchability, the stiffness, the roughness, the colorfulness, the thickness, the weight and the fragility.

In terms of the dress A-olive, the perception differences of the weight and the stretchability are the most influential to the impression of the material matching. According to the insight of the impression of the dress A-olive, the wrong impression that the fabric is thin and not stretchy is mainly due to the wrong impression of the fabric type. The weight and the thickness is associated together and the weight is mainly estimated from the thickness. It indicates that the information of the thickness is not sufficiently derived from the stimuli.

Figure 5.2.1 The dress A-olive

In terms of the dress B-blue, the perception differences of the stiffness are the most influential reason. That is followed by the perception differences of the weight, the thickness and the roughness. The general impression of the fabric is regarding its resemblance to rough jeans, which is thick, stiff and heavy. However, in reality, it is a very limp and thin dress, which is shocking for most viewers. This indicates that the rough texture of the dress leads to the wrong impression for the other related attributes.

Figure 5.2.1 The texture of the dress B-blue

In terms of the dress C-yellow, the perception differences of the stretchability and the roughness are influential for the impression of the material matching. According to the insight, the information of the stretchability for the fabric is missing, and it is hard to perceived from the other attributes for this dress. Moreover, the rougher texture makes the fabric feels less stretchy and the patterns makes the fabric looks rougher. Therefore, it indicates that the pattern of this fabric is one of the main reasons for making the wrong perception.

Figure 5.2.2 The pattern of the dress C-yellow

In terms of the dress D-black, the perception differences of the stretchability, the colorfulness, the fragility, the softness and the stiffness play an important role on the impression of the material matching. According to the insights of the overall impression about the dress D-black, it is hard to perceive details from the stimuli since the black color makes the details invisible, such as drapes and wrinkles. This influences the perception accuracy of the fragility, the softness and the stiffness. On the other hand, the appearance of the dress and invisible details make it look like a formal dress. However, the fabric is very stretchy and smooth, which makes it feels like a casual dress. This contrast is the main reason that causes the wrong impression of the type of the dress.

Figure 5.2.2 Dress D-black

In terms of the dress E-cyan, the perception differences of the weight and the colorfulness have influences on the material matching. Based on the insights regarding the features of the dress, the dress E-cyan has a thick and heavy lining and it has protruding white lines on the surface of the fabric. Viewers might miss or skip the textual information which informs them about the lining. Since the fabric weight could not be isolated from the product weight, missing lining information leads to the wrong perception of the weight. Additionally, the perception differences of the stiffness are mainly caused by the misunderstanding of the surface structure due to the protruding white lines. Those lines make the fabric become stiff, but it is regarded as printing by the viewers.

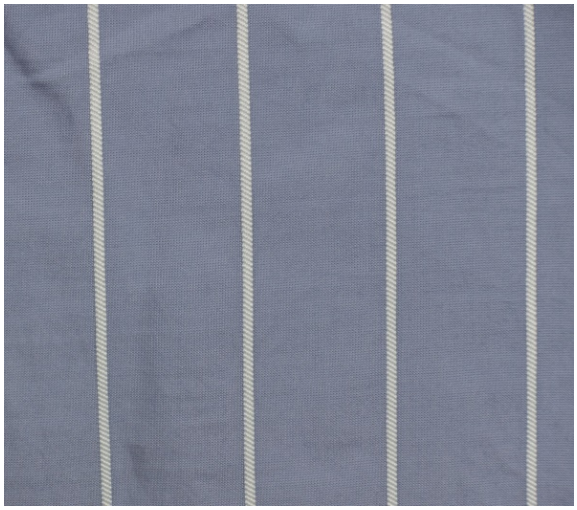


Figure 5.2.1 The protruding white lines of the dress E-cyan

In summary, there are three main factors that directly influences the perception accuracy and impression of material matching.

First, the type of the dress is the leading factor. If certain features of the dress were conflicting with the type of the dress, the viewer would make assumptions based on their personal imagination of the type of the dress. For example, the viewer would interpret the “rough and thin jeans” as “rough and thick jeans”, since most impressions of the jeans fabric are rough and thick

Second, the texture or the pattern of the fabric are influential to the judgement of the fabric, which directly causes the wrong perception of related attributes, such as the roughness and glossiness.

Third, the details of the fabric, such as drapes and wrinkles, are helpful for interpreting the attributes. However, sometimes, more assumptions also mean more potential mistakes.

5.2.3 Links between attribute perception and fabric or product features

Based on the previous discussion, it is easy to find out that there are certain relations between perception of the attributes and fabric or product features. Therefore, all the insights about how each attribute is perceived from certain fabric or product features all summarized in the figure 5.2.2.

The link between certain attribute and feature represent that this attribute could be perceived from this feature. For example, the thickness could be perceived from the drapes and wrinkles of the fabric. The color of the lines is only for readability reasons.

According to the insights about which attribute is more considered for purchasing the product, the considered attributes are marked with the orange color of the thick frame.

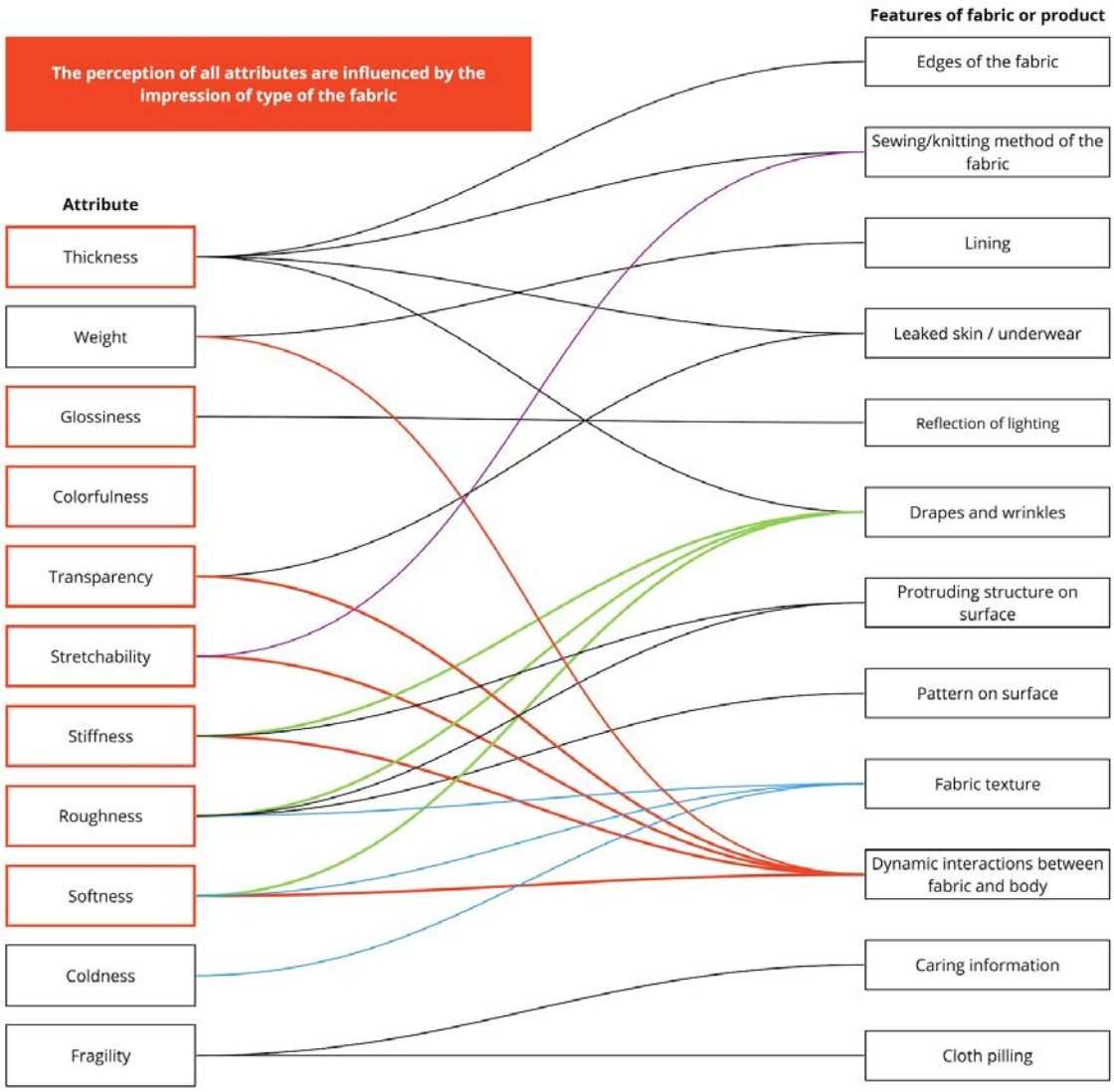


Figure 5.2.2 Links between attribute perception and fabric or product features

5.3 Discussion about the influences of different conditions on material perception

In this section, the results from the section 4.2.3 and the section 4.4 are discussed in order to understand the advantages and disadvantages of the 5 combinations of the presentations. 5 conditions, which are tested in the experiment, represent 5 different combination of the presentation methods. More specifically:

Condition 1: Basic photographs and text
Condition 2: Basic photographs and text & Extra detailed material photographs
Condition 3: Basic photographs and text & Scale references of fabric attributes
Condition 4: Basic photographs and text & Video of model wearing the product
Condition 5: Basic photographs and text & Video of hands interacting with the product

In order to increase the readability of the result, the 5 conditions are mentioned by their representative and shortened forms in the following discussion:

- Condition 1-basic
- Condition 2-extra
- Condition 3-scale
- Condition 4-model
- Condition 5-interaction

The stimuli of 5 conditions could be checked in the website: https://www.jingliang-shen.design/stimuls

5.3.1 Influences of different conditions on material perception

According to the experiment design, condition 1-basic is the basic combination of presentation methods consisting of photographs and text. All the other conditions, which provide extra information corresponding with the previous theoretical study, are compared with it respectively in order to evaluate the influences on the perception accuracy of the presented products.

Comparison between condition 1 and 2

According to the previous study, learning is more effective as the number of available stimuli increases (Moore et al. 1996; Severin 1967). Therefore, providing more stimuli should have positive influences on the material perception, since the process of perceiving is also a learning process. In the condition 2-extra, 3 extra stimuli are provided, and based on the from the data analysis, the condition 2-extra has positive influences on the impression of the material matching, only for the dress E-cyan. However, for the dress B-blue, the condition 2-extra has negative influences on the perception accuracy of the weight. That is because the weight is influential to the impression of the material matching for the dress B-blue and the condition 2-extra has resulted in negative influences on having the correct impression of the material matching.
In terms of the perception accuracy, this contrary result indicates that condition 2-extra might have positive influences only on certain type of the product or certain features.

From the product perspective, according to the discussion in the last section, for the dress E-cyan, the main reason of wrong perception is due to the leading impression regarding the protruding white lines on the surface. That is caused mainly by the feeling of the very rough

texture. In the condition 2-extra, a lot of information about the texture is provided. From the insights that reflect positive opinion of the extra detailed material photographs, "Rich information about the texture, which would be commercially successful." and "Informative for the pattern or structure of the fabric", there is indication that the condition 2-extra provides useful information for the perception. On the other hand, since the perception of roughness is associated with the weight (discussed in the section 5.1.1), for certain type of the fabric, the condition 2-extra might provide too much details about the texture, which might lead to the wrong estimation of the weight when viewer is not familiar with the viewing fabric. For the dress B-blue, which has the misleading texture with the very rough feeling, the condition 2-extra might be the cause of the wrong estimation, that lead to the wrong estimation of the weight.

In conclusion, the discussion suggests that the condition 2-extra are informative or useful for presenting the texture, the pattern or the structure. But, according to the insights, "more information means more wrong assumptions", which might lead to the wrong estimation of the texture for the consumers who are not experienced in the fabric.

Comparison between condition 1 and 3

Verbal and nonverbal systems function independently and can have additive effects on human memory and understanding (Paivio 1991). Therefore, in the condition 3-scale, the information that is directly related with the attributes is provided in a textual form. According to the result from the data analysis, for the dress B-blue, the condition 3-scale has positive influences on the perception accuracy. The dress B-blue has the misleading texture with the very rough feeling and the condition 3-scale provides precise information about the roughness. These could indicate the reason why the condition 3-scale has positive influences on the perception accuracy of this the material with misleading impression. However, according to the interview, people prefer believing their personal impression derived from the visual perception rather than the conflicting external inputs. The most serious issue for the scale references is that very little people do not believe the information on it. Therefore, methods to make viewer believe the information from external input could be further studied.

Comparison between condition 2 and 3

It is interesting to discuss the differences between the condition 2-extra and the condition 3-scale, because extra visual information and textual information is provided in the 2 conditions respectively.

For the dress C-yellow, the condition 2-extra has positive influences on the perception accuracy of the transparency compared with the condition 3-scale. Although the information of the transparency could be both perceived in two conditions, even the information in condition 3-scale is more direct, the perception accuracy is still higher in the condition 2-extra.

On the other hand, for the dress B-blue, the condition 3-scale has positive influences on the perception accuracy of the stiffness and the softness comparing with the condition 2-extra. As we discussed in the section 5.2.1, the stiffness and the softness are related with the feeling of comfort.

Above all, the discussion might suggest that the condition 3-scale is more useful to presenting the attributes that are related with the comfort, such as the softness and the stiffness. Because those attributes are also hard to be perceived form the visual presentations. However, this is only a unreliable speculation, because the compared dresses are not same.

Comparison between condition 1 and 5

Condition 5-interact is proposed base on the study of Mayer in 2003, which has suggested that meaningful learning occurs when learners build mental representations while processing information is presented to them. This corresponds with the previous interpretation in the section 5.1.2, which also indicates that the main perception step is affected by previous experience and build mental representations when they perceive the material.

In this way, although the result is not significant (P = 0.71), it still possible to suggest that the condition 5-interaction has positive influences on the perception accuracy. This indicates that the condition 5-interact has positive influences on helping viewers by reminding the correct previous experience. For example, based on the insights of perception information from the condition 5-interact, the movement of swaying the fabric corrects the wrong perception of the roughness for the dress C-yellow. This also happens to the dress E-cyan for the stiffness. And, all these two dresses are easily to be interpreted in the wrong direction, because of the unexpected texture or surface structure.

Comparison between condition 4 and 5

Although there are no significant results coming from the experiment, this is a pleasant result for the comparison of condition 4-model and condition 5-interact. No differences between them could mean that the familiar information can be perceived from both presentations. Considering the financial resources required for generating two different videos, the condition 5-interact has already won for better communicating the material from the practice perspective.

5.3.2 Advantages and disadvantages of different presentation methods

According to the insights of opinions on each presentation methods and the information perceived from each presentation methods, the advantages and disadvantages of different presentation methods are discussed in this section, in terms of presenting different dresses and fabric features.

Photographs of the product and model wearing the product

Generally, as compared to product photographs, the photographs of model wearing the product is more informative and preferred by the customers. The photographs of model wearing the product is more informative for presenting the general impression of the fabric, because it shows the interactions between the fabric and the body. Additionally, the viewers might imagine and interpret the fabric movement from the interactions, which is better for the material understanding. In most of situations, similar information could be perceived from both presentation methods. However, for the dress D-black, the black color makes the fabric details lost in the photographs of the product. From the color matching perspective, the skin of the model also provides references for perceiving the color, which is helpful for imagining and understanding how color look in reality.

However, the model might influence the impression of the dress, which influences the material perception. As we mentioned before, the type of the dress directly contributes towards the assumption of the fabric. It is a double-edged sword to involve a model for communicating the material. For example, one participant in the interview mentioned that the model influenced her impression of the dress D-black, which made her think it is a formal dress that is stiff. This way, the photographs of the product is more realistic and less misleading.

The detailed material photograph and the extra detailed material photographs

Based on the previous discussion and insights of perceived information from the presentations, both presentation methods are useful and informative for presenting the texture, the pattern and the surface structure of the fabric. For example, they are helpful for presenting the white lines on the surface of the dress E-cyan. Additionally, the extra detailed material photographs are helpful for perceiving the attributes relating to comfort, because there are lots of drapes and wrinkles presented in the extra detailed material photographs and those drapes and wrinkles are useful for perceiving the attributes, such as roughness, stiffness, thickness.

For the detailed material photograph, the size of cropped part is hard to estimate, which makes viewers having the wrong assumption of the fabric from the close view of the texture. Additionally, because it is too flat, the attention of viewers is only on the small part, which make them overestimate some details. In this way, the extra detailed material photographs have more advantages, since it not only provides rich information with the close view, but also can be used to judge the size of the presented part from the whole image of all drapes and wrinkles.

On the other hand, both presentation methods have the same issue in that providing the details of the texture might lead to the wrong perception of the roughness or glossiness. For example, for the dress B-blue, a rough but soft and light dress, the feelings of the texture are conflicting with normal impression. And, for the dress E-cyan and the dress A-olive, the texture looks too shiny under the hash and white lighting.

Textual information

According to the insights from the interview, a few participants subconsciously skip the important information, such as lining, the description of thickness or softness. There are 2 main reasons for this fact. One is that the viewers subconsciously ignore the text. This can be due to the fact that some participants do not like reading the text or they think reading costs them too much effects. Another one is that, for certain fabric, participants do not understand the exact meaning of the material information. For example, in terms of the dress B-blue, the "100% Lyocell" does not have any practical meanings for most of viewers because they do not know this material before. Although this fact is not optimistic for the utility of the text, it is very useful to direct the information provided towards ones that show the relevant fact of the fabric features, such as lining, the description about the stretchability and transparency, washing and caring.

The price is also mentioned here because it is mainly presented by the textual information, the price, as the external factor that is extracted from the experiment, is very influential to the estimation of the fabric. According to the insights from the interviews, for the dresses, the price directly influences the perception of the thickness, stiffness and the type of the fabric. For example, if the price was high, the viewers would expect thick, soft and limp material, because those features of the material mean good quality and comfort.

Scale references

According to the general feedback from the questionnaires and the interviews, the scale references are Informative and precise. However, from the viewer perception, information derived from the photographs are more convincing and preferred as compared to the information derived from the scale references. Although the scale references are more useful for the attributes that are hard to perceive from the photographs, such as the thickness, the transparency and the stretchability, the viewers do not believe them. This will only make them regret about their decision later on.

Videos

Based on the insights from the interviews, videos are generally more informative and precise for communicating the material with the viewers. Because they present more views of the fabric such as the color changes when the fabric is under the different strengths of the lighting, the fabric movements as well as the active interactions between fabric and the body. Only the videos could correct the wrong impression caused by the photographs.

According to the both quantitative and qualitative results, the video of hands interacting with the fabric is better for understanding the material because it shows more extensive movements and interaction with the material. This provides rich information about the fabric itself and makes viewers focus on the fabric. However, people would not interact with the fabric in this way in reality, and they care more about how they look like when they are wearing the dress.

Therefore, the video of model wearing the product is better for viewers to imagine how they look like when they are wearing the dress. In addition, the main practical meaning of the stretchability to buyers is to understand the acceptable tolerance of the dress. In other words, the video of model helps the viewers to imagine whether this dress fit them or not, which explains the stretchability to them. This is missing from the video of hands interacting with the fabric. Moreover, with the exception of the dress D-black, the other dresses are not very stretchy. So, the video of hands interacting with the fabric is not useful for communicating the stretchability.

6. Guideline and showcase

Lots of insights about better communicating the material with customers online are collected during the whole process of the research. Those insights are transferred into a guideline and several showcases, which are introduced in this chapter.

6.1 Guideline for material presentation of the clothing product on the websites

6.1.1 Tops 5 to consider

1. The first impression of the product material is extremely important. Try to present correct and precise information as much as possible in order to leave the correct first impression to consumers. The video of hands interacting with fabric is the best choice to do this. (See the guideline and the showcase in section 6.2)
2. Particularly present the attributes that have different impression comparing to the common impression of this type of clothing. (To know more about the relation of impression between the attributes, check the section 5.1.3)
3. Some attributes of the fabric are more considered when customers make decisions of purchasing. (To know more about the links between attribute perception and fabric or product features, check the section 5.2.3) In this way, use the suitable presentation method to heighten the impression of features or attributes.
4. For better communicating the material with customers, important features of fabric or product are recommended to be presented with specific presentation method. (Check the recommendation for presenting specific features of fabric or product in the section 6.1.2)
5. Consumers do not like reading, so make the important information visualized.

6.1.2 Recommendation for presenting the specific feature

According to all the insights and discussions related with the presentation methods, there are some recommendations helping to choose the suitable presentation methods for presenting the fabric or product features. All the recommendations are summarized in the figure 6.1.1.

In the figure 6.1.1, all the features considered by the consumers are listed in the left side of the figure. This list also can be used as a checklist to help the retailer to classify products. Since the amount of the studied dresses is limited, it could be further studied in another research. Meanwhile, all the presentation methods that are studied in this research are listed in the right side of the figure.

If one specific feature is linked with one presentation method:

- The orange line means the first recommended presentation method for presenting specific feature.
- The blue line means the second recommended presentation method for presenting specific feature.

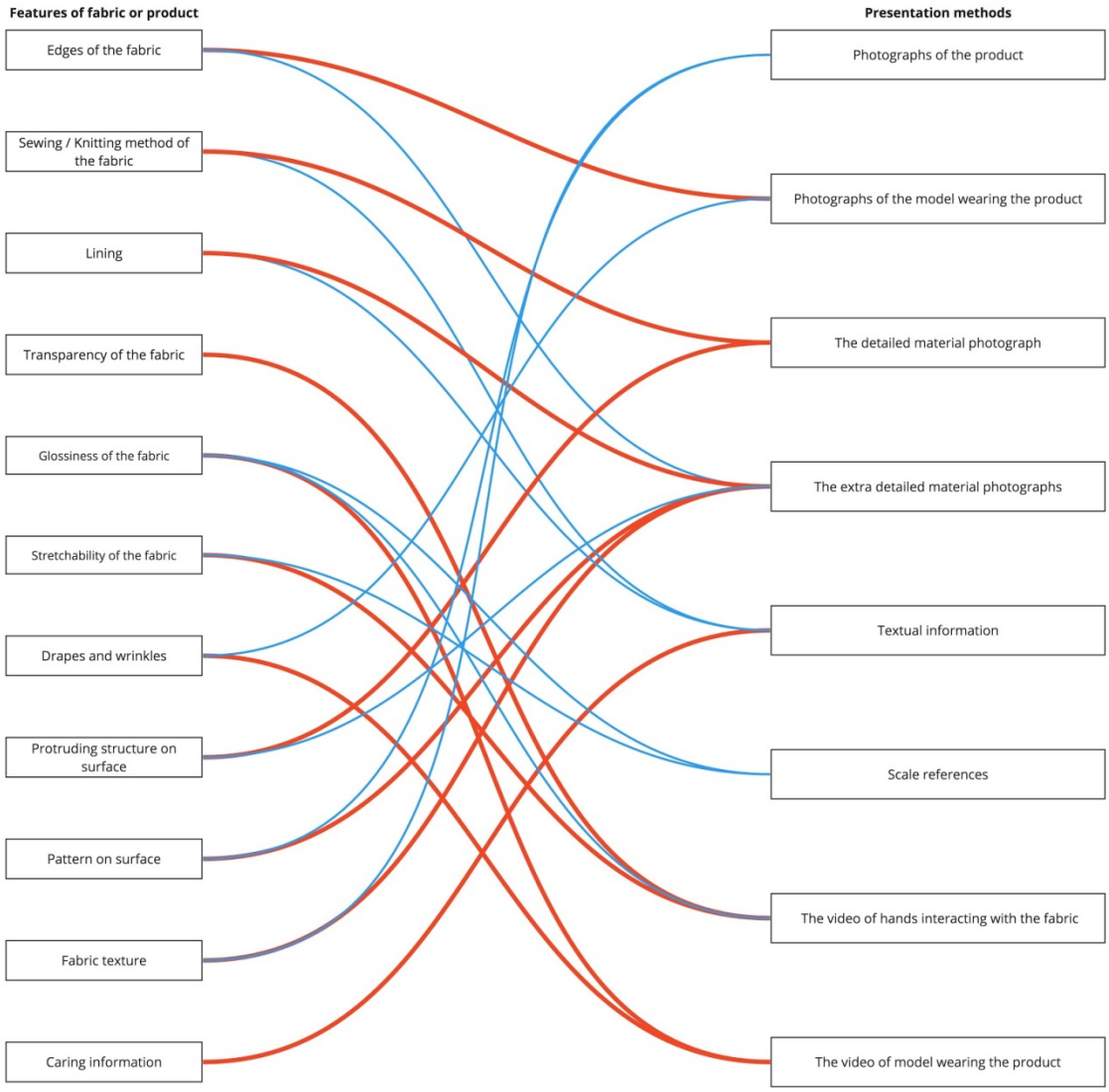


Figure 6.1.1 Recommendation for presenting the specific feature of fabric or product

6.1.3 Recommendations for existing presentation methods

List of useful recommendations for improving the existing are summarized in the section 4.7 - D. Improvement for the presentation method. For better communicating the product material with customers, the valuable and implementable Recommendations are heightened and explained in this section.

Photographs

- Provide the photographs of model sitting on the chair

The sitting position explains more information about how fabric interact with great range of motions that people do when wearing the dress. The sitting position always links to the embarrassing experience of the fabric, which reminds customers the experience of accessing the similar material.

- Provide close-up views of the position where the mouse hanging on

If the close-up view presents the details of the position where the mouse hanging on, the viewer would spontaneously link the information between the whole image and the close-up view. This makes viewers have more accurate estimations of the area size of the close-up view and better understanding of the texture of the fabric.

- Add a side view of folded fabric to directly present the thickness of the fabric

Textual information

- Describe the position of the lining clearly

Few products have confusing lining position. For example, some dresses only have lining in the bottom part of the dress, which makes the dresses translucent and less heavy. but it is hard to be perceive from other presentations. This can directly lead to the wrong judgement of the fabric.

The video of model wearing the product

- Present an action of morel sitting down and standing up

The sitting position explains more information about how fabric interact with big range of motions that people do when wearing the dress. The sitting position always links to the embarrassing experience of the fabric, which remind customers the experience of accessing the similar material.

6.2 guideline for generating the video of hands interacting with fabric

Comparing with the video of model, the video of hands interacting with fabric is financially durable and less consuming of resources for the company. This makes it have more implementable and practical value for communicating the correct information with the customers.

The guideline is introduced for generating the video of hands interacting with fabric in this section. The re-making of the video of hands interacting with fabric has already combined all the suggestions and insights from the interviews. Check the insights of the improvements in the section 4.7.2 - D. Improvement for the presentation method.

The showcases of the video can be viewed in the websites: https://www.jingliang-shen.design/

6.2.1 Preparation for making the video

Background and prop

The video is made in the Vision lab in the industrial design factory of TUD. A white background is chosen in order to extract the interferences from the environment and imitate the commercial situation of the video shooting. The camera, SONY RX-100, is used for recording the video in the 4K recording model.

3 props need to be prepared, which are shown in the figure 6.2.1.

1. A hanger with an extra handle: A hanger is used to hang the product and the extra handle makes the person invisible in the video
2. 2 clamps for fixing the product

3. A piece of black-hard paper for presenting the transparency of the fabric

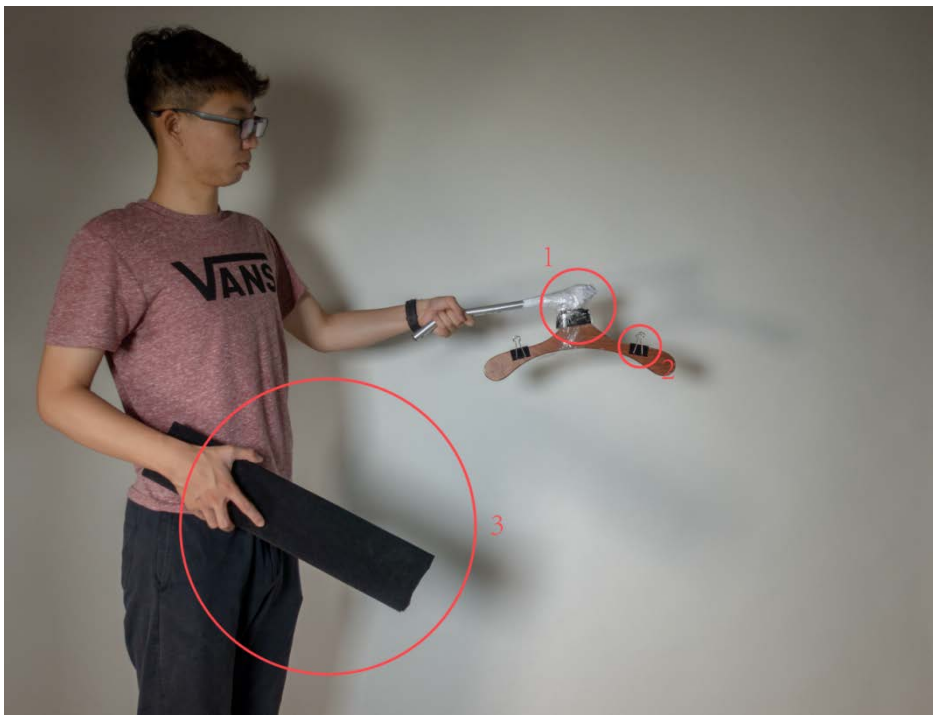


Figure 6.2.1 Props

Lighting

3 lights are used, which are shown in the figure 6.2.2. There are two light types:

- The light type 1, which is shown in the left side of the figure 6.2.3, is used for heightening the product and add a little bit yellow lighting in order to make the color of the lighting close to the nature lighting rather than the harsh and white studio lighting.
- The light type 2, which is shown in the right side of the figure 6.2.3, is used for illumination. One is a little bit brighter compared with the other one, which makes the shadow on the fabric more realistic.

Figure 6.2.2 Lighting situation

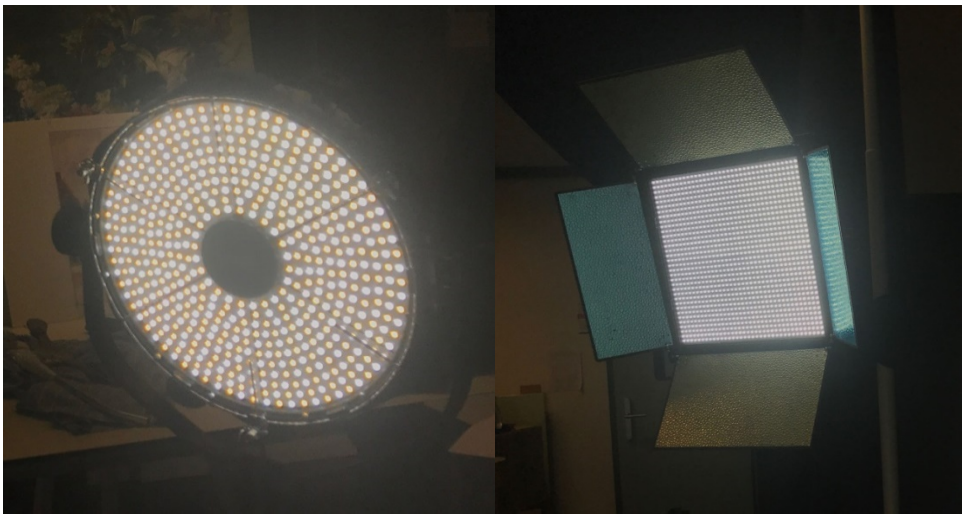


Figure 6.2.4 Light type 1 (left) Light type 2 (right)

6.2.2 Action steps of interacting between hands and the product

1. Tremble and sway the fabric hung up on hangers
    a. Left to right
    b. Up to down
    c. Front to back

2. Tremble and sway the fabric hung up on hangers in close-up view
    a. Left to right
    b. Up to down
    c. Front to back

3. Insert the black-hard paper into the product

4. Slowly stretch the fabric 3 times with the strength

5. Squeeze the fabric and slowly release it

6. Zoom in to show the texture

6.3 Improvement for the scale references and showcase

Although there is no statistic result to proof the positive influences of the scale references on the material understanding, plenty of positive feedback are collected by the presentation review form for the scale references. The feedback could be checked in the section 4.5. Those feedbacks indicate that it is valuable to further explore the influences of updated scale references on communicating the clothing material with customers.

Therefore, the suggestions of improvements collected from the interviews are implemented on the redesign of the scale references.

Improvements

- Less amount of the scale segmentations.

There are 10 segmentations of the scale from the previous scale references, which make the viewers confused. According to the insights related with the scale references, there are two main functions of the scale references. One is to show viewers the opposite suggestion, which might change the viewer's wrong perception. Because, only if the opposite opinion distinctive enough, the viewer would doubt about their own opinion. The other one is to provide the similar opinion as viewers have in order to help the confirm their own perception. Therefore, for different attributes, the number of the segmentations of the scale is different.

- Re-select the attributes

According to the insights, which attribute is more considered when consumers make decisions of purchasing, only the most influential attributes are included in the redesign. The included attributes are: Thickness, Stretchability, Stiffness, Softness, Glossiness, Transparency

- Attractive visualization and easy-read content

Suggestive descriptions are added in order to directly provide viewers the information they need.

6.3.1 Showcase for the dress C-yellow

The previous design of the scale references could be checked in the section 3.4.1 at figure 3.4.6.

Figure 6.3.1 The photographs of model wearing the dress C-yellow

How experts think about this dress?

How thick?	Very thin	Quite thin	Normal	Quite thick	Very thick
How stiff?	Very limp	Quite limp	Normal	Quite stiff	Very stiff
How soft?	Very soft	Quite soft	Normal	Quite harsh	Very hash
How sketchy?	Not sketchy at all	Slightly sketchy	Quite sketchy	Very sketchy	
How shiny under the sun?	Not shiny at all	Slightly shiny	Quite shiny	Very shiny	
See underwear?	Yes	No			

Figure 6.3.2 Showcase of the redesign for the dress C-yellow

7. Conclusion and reflection

7.1 conclusion

This research focuses on the communication between the consumers and product material through different presentation methods in an online shopping environment. Therefore, the research starts with a study of popularly used presentation methods on webpages for better communicating the materials of clothing, more specifically, dresses. After studying the related researches and 19 popular clothing shopping websites in Europe and China, an experiment with 90 female participants and 12 interviews are conducted to investigate the influences of 5 different combinations of online product presentation methods on consumers' perception accuracy of different product materials. The quantitative results from the experiment and the insights from the interviews are analyzed and discussed. According to the quantitative results, the studied 5 dresses have significant impacts on the perception accuracy. Moreover, combining the experiment results with the insights from the interviews, the discussion indicates that the fabric features of different dresses are the main reasons for the influences on the perception accuracy. From the presentation method perspective, no solid results could statistically show that the different combinations of online product methods have influences on the perception accuracy. The advantages and disadvantages of different presentation methods for presenting clothing fabric are compared and discussed, which comes up with a guideline for helping the company to present their products online.

Lots of insights and inspirations are obtained from the discussion about the reasons for the perception differences, which could be further researched.

7.2 Reflection

Although the research is come to the end, a lot of limitations and inspirations found during the process need to be further considered.

Reviewing on the main limitation of the research, only one type of clothing with limited 5 products is studied. This makes this research build limited contribution to the material communication online and comprehensive business value. Since the research indicates that one influential factor for the perception differences is the fabric or product feature, more research needs to be done in order to cover a larger range of the clothing product types in order to build a whole image of those features.

Second, there are more than half participants (53 out of 90) are Chinese, which make this demographic factor influential. During the interview, it is not hard to find that Chinese people are more experienced in the online shopping comparing with the Europeans. In addition, there are differences of material preference between Chinese people and Europeans, which also have influences on their material perception.

Third, the selection of the attributes and the design for measuring the attributes both could be optimized. The selection of the attributes is not well examined in the reliability, which might have negative influences on the research results. One the other hand, the measuring method is to complicated According to the observation during the experiment, participants make mistakes when they rate the scales because there are too many segmentations of the scale and too many attributes to rate.

Fourth, there are some technical issues for making the stimuli, since the researcher is not a expert in lighting control. According to the feedback from participants, the lighting for generating photographs and videos are sometimes too white and bright, which directly influences the impression of the color matching.

There are still a lot of other limitations and mistakes in other aspects, which indicates that the researcher still needs to keep learning and optimizing.

There are some good inspirations that need to be heightened. According to the quantitative data analysis and insights about the considerations of purchasing dresses, some attributes are more influential for the impression of the material matching. In this research, only a part of the reasons is analyzed based on the limited resources. It is valuable to see the whole image of exact reasons behind it and how those reasons could be combined in order to explain the essence of material perception online.

From the consumer perspective, during the experiment and interviews, the experience and the preference of the participant have huge influences on the material perception. Therefore, it is interesting and valuable to involve the online shopping experience or the shopping preference as a moderator in order to see the differences between those groups of people on the material perception online.

Thank you for your reading

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Appendix

Appendix. A

Interview guide for the insight generation

Ice breaking

- Self-introduction of Interviewer
- Ask about interviewee's experience of apparel online shopping
- Project background introduction

Question 1: What type of apparel product do consumers care more about materials?

- What kinds of clothing do you care materials most? Why? (Give some suggestions)

Question 2: What feelings of materials are hard to perceive?

- Do you have experience of returning because of materials? Ask about the story.
- Give some keywords for references. Ask about opinions.

Sweat resistant	Breathable	fast drying 快干
Stretchable 弹性好	Water repellency 防水性	Edge creases easily
Thickness	Influence on skin	After washing (care)
Stiff (僵硬的)	Sticky (粘黏的)	Nonabsorbent (不吸水的)
Clammy (冷湿的,粘湿的)	Damp (潮湿的)	Clingy (紧贴的)
Rough (粗糙的)	Scratchy (刺痒的)	Colour

Question 3: What information do people mainly perceive from different presentation methods that are popular?

- Present selected 15 different presentation methods, and ask about the opinions and stories.

Appendix. B

Consent form

Consent Form for
Apparel material perception and online presentation methods

This research focuses on helping apparel Internet retailers getting a systematic understanding, which is about advantages and disadvantages of different methods for presenting clothes in order to get a correct impression about the material of products. This helps to lower the return rate in online shopping environment.

In this research, an experiment is designed, in which 5 dresses are tested to understand the accuracy of material perceptions in terms of different combinations of online apparel product presentation methods.

Participants voluntarily join the experiment and they will be asked to fill one questionnaire after checking presentations of each dress and one questionnaire after checking the real viewed dress.

Participants who agree to have an interview before the experiment will have a semi-structured interview to share their opinions of each presentation method and perceived information when they are checking the different presentation methods.

Participants who take part in the interview will get a small reward.

Please tick the appropriate boxes	**Yes**	**No**
Taking part in the study		
I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	□	□
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	□	□
I understand that taking part in the experiment involves filling in several questionnaires about material perceptions.	□	□
If you agreed to have an interview before the experiment, an audio will be recorded during the interview. This audio will be saved anonymously, and your name will not be connected to it.	□	□
Risks associated with participating in the study		
Several normal-used fabric materials will be used in study, so if I am allergic to any normal-used fabric materials, I will inform the researcher.	□	□
Use of the information in the study		
I understand that information I provide will only be used for academic reports, and any of my data is anonymous and could not identify me. All the data will not be shared beyond the study team.	□	□
I agree that my input during the interview can be quoted in research output anonymously.	□	□

Signatures

_____	_____	_____
Name of participant	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Jingliang Shen	JingliangShen 沈靖亮	_____
Researcher name	Signature	Date

Study contact details for further information: Jingliang Shen, +31649304288, jingliang.shen@gmail.com

Information collection form

Information collection

*Required

Introduction

You are being invited to participate in a research about online apparel presentation and material perception. This study is being done by Jingliang Shen from the TU Delft.

This research study focuses on helping apparel Internet retailers getting a systematic understanding, which is about advantages and disadvantages of different methods for presenting certain products in order to get a correct impression about the material of products in order to lower the return rate.

It will take you about half an hour to complete this study.. The data will only be used for this academic study.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any question.

Key words explanations

Stiffness

The amount of stiffness the fabric sample has. It influences the bending and drape of fabric, which describes how rigid or inflexible the fabric feels. The opposite is limp or flexible.
Method of Assessment: Pick up the fabric and gently fold or shake the fabric to assess how stiff the fabric feels during manipulation.

Example of fabric with different stiffness

Stretchability

How stretchable the fabric feels. Lower stretchability indicates that the material is harder to be stretched; higher stretchability indicates that the material is easier to be stretched.
Method of Assessment: Pick up the fabric and gently stretch the fabric to assess how Stretchable the fabric feels during manipulation.

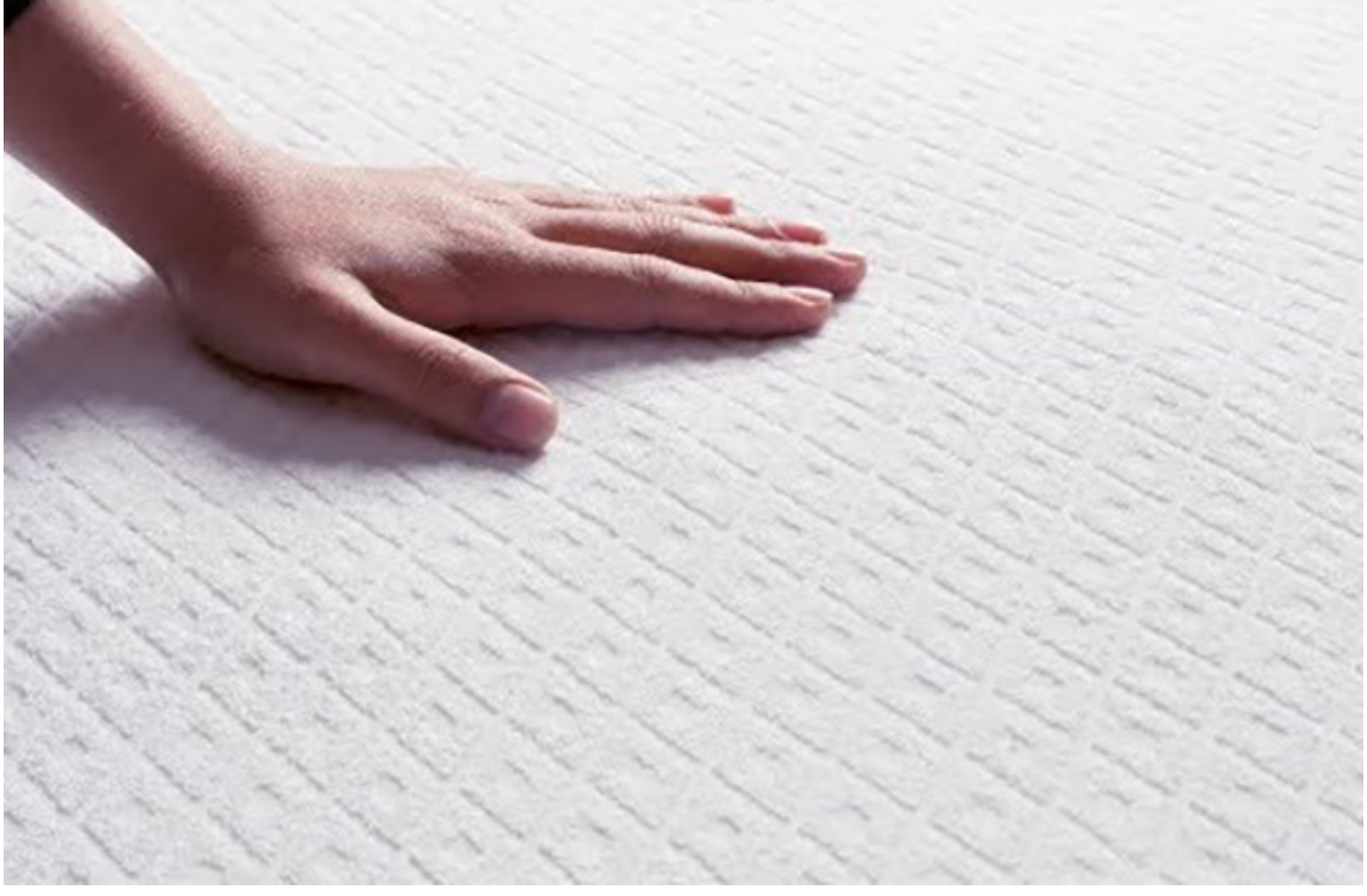
Example of stretchability assessment

Roughness

How rough the fabric feels. The fabric surface feels not even and lumpy. The opposite is smooth.

Method of Assessment: Feel the fabric placed flat on the table by gently running your finger tips on dominant hand across the fabric surface once in all directions and assess the amount of roughness.

Example of roughness assessment

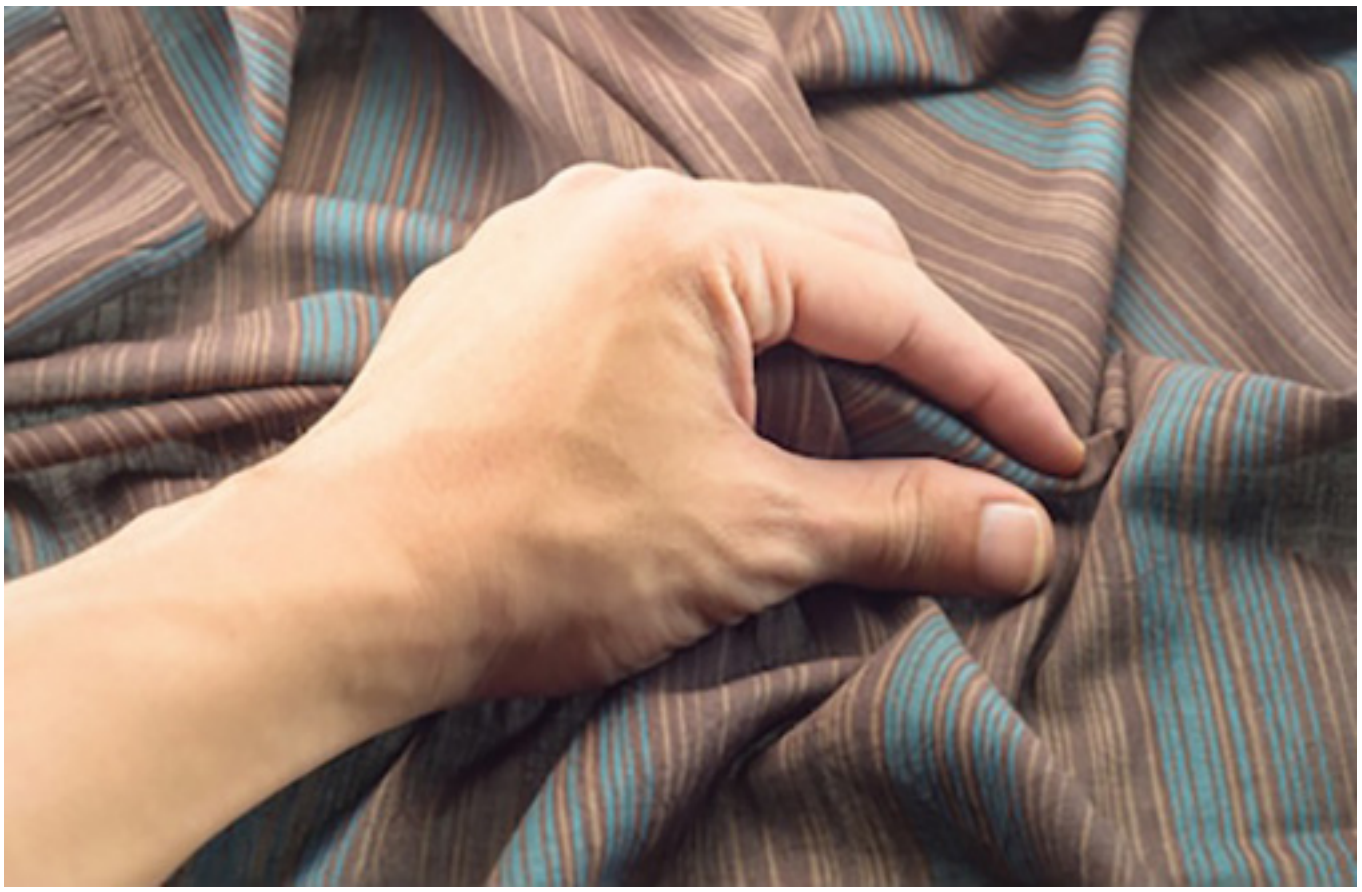


Softness

How soft the fabric feels. The fabric slips easily between the fingers and thumb when rubbed, there is no resistance or drag.The opposite is harsh.

Method of Assessment: Pick up the fabric and gently squeeze the fabric using your dominant hand and assess the amount of softness.

Example of softness assessment



Pay attention to the scale name!

Roughness *

If you were to reach out and touch the material, how rough would it feel? Low values indicate that the surface would feel smooth; high values indicate that it would feel rough. Imagine that you could feel the fabric placed flat on the table by gently running your finger tips on dominant hand across the fabric surface once in all directions and assess the amount of roughness.

	0	1	2	3	4	5	6	7	8	9	10	
smooth	○	○	○	○	○	○	○	○	○	○	○	rough

Softness *

If you were to reach out and touch the material, how soft or harsh would it feel? Low values indicate that the surface would feel harsh; high values indicate that it would feel soft. Imagine that you could pick up the fabric and gently squeeze the fabric using your dominant hand and assess the amount of softness.

	0	1	2	3	4	5	6	7	8	9	10	
harsh	○	○	○	○	○	○	○	○	○	○	○	soft

Coldness of touching *

To what extent would you expect the surface to feel cold to the touch? Low values indicate that the material would typically feel warm; high values indicate that the material would feel cold to the touch.

	0	1	2	3	4	5	6	7	8	9	10	
warm	○	○	○	○	○	○	○	○	○	○	○	cold

Information collection

1. **Your private data and input for this experiment will be analysed only for academic research reasons.** *

   Tick all that apply.

   - [ ] I have read the text above

2. **Please fill in your participant code number, thank you** *

   _____

3. **Please select your setting number, thank you** *

Mark only one oval.

- ◯ Setting 01
- ◯ Setting 02
- ◯ Setting 03
- ◯ Setting 04
- ◯ Setting 05
- ◯ Setting 06
- ◯ Setting 07
- ◯ Setting 08
- ◯ Setting 09
- ◯ Setting 10
- ◯ Setting 11
- ◯ Setting 12
- ◯ Setting 13
- ◯ Setting 14
- ◯ Setting 15
- ◯ Setting 16
- ◯ Setting 17
- ◯ Setting 18
- ◯ Setting 19
- ◯ Setting 20

4. **Please write down your age in number, thank you** *

_____

5. **Where are you from? (Nationality)** *

_____

6. **Are you currently…?** *

Mark only one oval.

- ◯ A student *Skip to question 7.*
- ◯ Employed for wages *Skip to question 7.*
- ◯ Self-employed *Skip to question 7.*
- ◯ Out of work and looking for work *Stop filling out this form.*
- ◯ Out of work but not currently looking for work *Stop filling out this form.*

Stop filling out this form.

7. **If you are a student or employer, what are you studying or working on?** *

   For example : project name or job title

Perception recording form

Material perception

*Required

1. **Please fill in your participant code number, thank you** *

   _____

2. **Please select the product code (Alphabet)** *

   Mark only one oval.

   - A
   - B
   - C
   - D
   - E

3. **Please select the product code (Number)** *

   Mark only one oval.

   - 1
   - 2
   - 3
   - 4
   - 5

You can recheck presentations while filling the form

Rating for features of material

Please rate your material impression of the product in terms of following features.

4. **Thickness** *

   If you were to reach out and touch the material, how thick would it feel? Low values indicate that the material would feel thin; high values indicate that it would feel thick.

   Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
thin	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	thick

5. **Weight of fabric** *

   If you were to reach out and touch the material, how heavy or light would it feel? Low values indicate that it would feel light; high values indicate that it would feel heavy.

   Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
light	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	heavy

6. **Glossiness** *

How dull or shiny does the material appear to you? Low values indicate a matte, dull appearance; high values indicate a shiny, reflective appearance.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
dull	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	shiny

7. **Colorfulness** *

How colorful does the material appear to you? Low values indicate a grayish appearance; high values indicate a colorful appearance, which could be either a strong single color or several colors.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
grayish	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	colorful

8. **Transparency** *

How transparent does the material appear to you? Low values indicate a opaque appearance; high values indicate a transparent appearance. Transparency of fabric describes the idea of see-through clothing. See-through clothing is any garment of clothing that allows the wearer's body or undergarments to be seen through its fabric.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not transparent	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	transparent

9. **Stiffness** *

If you were to reach out and touch the material, how stiff would it feel? Low values indicate that the surface would feel limp or flexible; high values indicate that it would feel stiff. Imagine that you could pick up the fabric and gently fold or shake the fabric to assess how stiff the fabric feels during manipulation.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
limp	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	stiff

10. **Stretchability** *

If you were to reach out and touch the material, how stretchable would it feel? Lower stretchability indicates that the material is harder to be stretched; higher stretchability indicates that the material is easier to be stretched. Imagine that you could pick up the fabric and gently stretch the fabric to assess how stretchable the fabric feels during manipulation.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not stretchable	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	very stretchable

11. **Roughness** *

If you were to reach out and touch the material, how rough would it feel? Low values indicate that the surface would feel smooth; high values indicate that it would feel rough. Imagine that you could feel the fabric placed flat on the table by gently running your finger tips on dominant hand across the fabric surface once in all directions and assess the amount of roughness.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
smooth	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	rough

12. **Softness** *

If you were to reach out and touch the material, how soft or harsh would it feel? Low values indicate that the material would feel harsh; high values indicate that it would feel soft. Imagine that you could pick up the fabric and gently squeeze the fabric using your dominant hand and assess the amount of softness.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
harsh	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	soft

13. **Coldness of touching** *

To what extent would you expect the surface to feel cold to the touch? Low values indicate that the material would typically feel warm; high values indicate that the material would feel cold to the touch.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
warm	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	cold

14. **Fragility** *

How easy to break is the material? High values indicate that a small amount of force would be required to break, tear, or crumble the material; low values indicate that the material is highly resistant and could not easily be broken. Imagine that you pick up the fabric and gently tear the fabric to assess its fragility

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
strong	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	fragile

Now, ask the researcher for the real product.

15. **Please do not compare with the last form you fill, just fill in this new form objectively.** *

Tick all that apply.

- [ ] Yes, I understand

Recheck features of material

All the questions ask about the product you just viewed. If you are not sure about any details of the real product, please check the product while you filling the form.

16. **Thickness** *

When you reach out and touch the material, how thick does it feel? Low values indicate that the material feels thin; high values indicate that it feels thick.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
thin	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	thick

17. **Weight** *

How heavy or light does it feel? Low values indicate that it feels light; high values indicate that it feels heavy.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
light	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	heavy

18. **Glossiness** *

How dull or shiny does the material appear to you? Low values indicate a matte, dull appearance; high values indicate a shiny, reflective appearance.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
dull	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	shiny

19. **Colorfulness** *

How colorful is the material appear to you? Low values indicate a grayish appearance; high values indicate a colorful appearance, which could be either a strong single color or several colors.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
grayish	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	colorful

20. **Transparency** *

How transparent does the material appear to you? Low values indicate a opaque appearance; high values indicate a transparent appearance. Transparency of fabric describes the idea of see-through clothing. See-through clothing is any garment of clothing that allows the wearer's body or undergarments to be seen through its fabric.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not transparent	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	transparent

21. **Stiffness** *

When you reach out and touch the material, how stiff does it feel? Low values indicate that the surface feels limp or flexible; high values indicate that it feels stiff. Pick up the fabric and gently fold or shake the fabric to assess how stiff the fabric feels during manipulation.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
limp	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	stiff

22. **Stretchability** *

When you reach out and touch the material, how stretchable does it feel? Lower stretchability indicates that the material is harder to be stretched; higher stretchability indicates that the material is easier to be stretched. Pick up the fabric and gently stretch the fabric to assess how stretchable the fabric feels during manipulation.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not stretchable	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	very stretchable

23. **Roughness** *

When you reach out and touch the material, how rough does it feel? Low values indicate that the surface feels smooth; high values indicate that it feels rough. Feel the fabric placed flat on the table by gently running your finger tips on dominant hand across the fabric surface once in all directions and assess the amount of roughness.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
smooth	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	rough

24. **Softness** *

When you reach out and touch the material, how harsh or soft does it feel? Low values indicate that the material feels harsh; high values indicate that it feels soft. Pick up the fabric and gently squeeze the fabric using your dominant hand and assess the amount of softness.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
harsh	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	soft

25. **Coldness of touching** *

When you reach out and touch the material, how cold does the surface feel? Low values indicate that the material typically feels warm; high values indicate that the material feels cold to the touch.
Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
warm	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	cold

26. **Fragility** *

How fragile or easy to break is the material? High values indicate that a small amount of force is required to break, tear, or crumble the material; low values indicate that the material is highly resistant and could not easily be broken. Pick up the fabric and gently tear the fabric to assess its fragility.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
strong	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	fragile

27. **Color matching** *

To what extent would you think your perceived colour of material match with the real color? Low values indicate that the matching level is low; high values indicate that matching level is high.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not match	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	perfect match

28. **Impression of this material matching (Focus on material only)** *

How well do your impression or perception of this material match with the real product? Low values indicate that the matching level is low; high values indicate that matching level is high.

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
not match	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	perfect match

Presentation review form

Review of scale references

*Required

1. **Please fill in your participant code number, thank you** *

   _____

2. **Please select the product code (Alphabet)** *

   Mark only one oval.

   - ◯ A
   - ◯ B
   - ◯ C
   - ◯ D
   - ◯ E

3. **Please select the product code (Number)** *

   Mark only one oval.

   - ◯ 1
   - ◯ 2
   - ◯ 3
   - ◯ 4
   - ◯ 5

Review of scale references

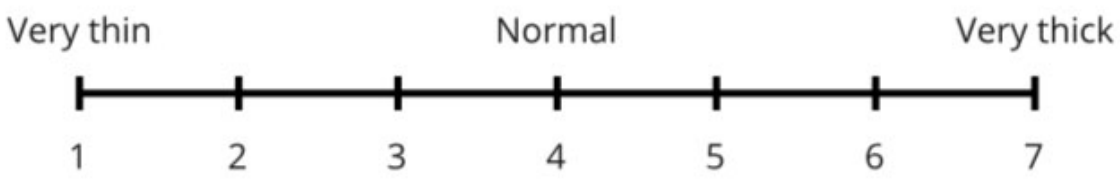
Those scale references are generated according to the average feedback from fabric experts and consumers

How do you think of this way of presenting?

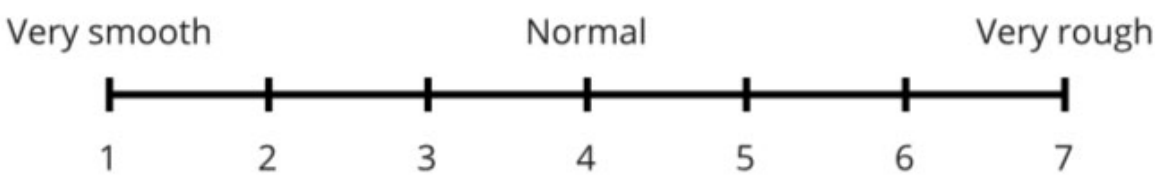
Description of material characteristics

How stretchable this material is.

How thick this material is.



How rough this material is to touch.



How soft or harsh this material is to squeeze.

How stiff this material is.

How transparent this material is

4. **Do you like those input from fabric experts or other consumers?** *

Mark only one oval.

- Extremely like
- Very like
- Quite like
- Slightly like
- Neither like or dislike
- Slightly dislike
- Quite dislike
- Very dislike
- Extremely dislike

5. **Do you think this presentation is useful for your material perception?** *

Mark only one oval.

- extremely useful
- very useful
- quite useful
- slightly useful
- Neither useful or useless
- slightly useless
- quite useless
- very useless
- extremely useless

6. **What other scales do you think are missing?** *

If you do not think anything is missing, type "NO".

Appendix. C

Participant number: Setting number: Product code:

		Product overview with model Product close view with model Product overview Product close view	Textual information	Material detail (flat) Material detail (folded) Material detail (scrunched) Material detail (stretched)	Scale references	Video of model	Video of materal interaction	Compare two videos
Material information perceived	Thickness							Tip: Which one is more helpful for your material perceptions? What other things you want to see from each video? How you want to improve?
	Weight of fabric							
	Glossiness							
	Colorfulness							
	Transparency							
	Stiffness							
	Stretchability							
	Roughness							
	Softness							
	Coldness of touching							
	Fragility							
Product Information perceived								
What you want to improve?								
What is missing?					what other scales?			
Which presentation is the most useful? and why?								
What do you care about dresses?								
Any other comment?								

Appendix. D

Summary of the insights with original quotation

General perception

What leads the impression of the fabric?

The wrong perceptions are easily caused by previous experience of viewers

- Impression from the previous viewed presentation in the experiment
    - So, I judge more on the model, not the extra detailed pictures. And, yes, I just expect a jeans fabric, but it was not. (B2)
    - sometimes you just see the video first, don't look at all the material and pictures, after you get the feeling, then you fast go deeper to the material. (B4)
- Previous experience of accessing the similar fabric
    - 因为前几个吧我接触过类似的衣服, 我就能联想到它是什么样……(D5)
    - Just because of the previous experience, I expect something else. (B3)
    - 其实主要就是感觉, 然后就是平时看的衣服的那些料子,就感觉他就是那种黑色的纱的
    - B: 所以其实是把你导向了一个错误的方向?
      A: 对, 会直接联想曾经穿过的, 或者摸过的衣服.
    - 你先看这料子, 就是那种比较熟悉的料子, 就是衬衣那种. (E2)
- Influenced by another viewed dress in the experiment
    - when I look at the video, it makes me think of the first dress, so just based on the previous experience. (B5)
    - 因为我之前看的时候是那种带闪的那种, 而且感觉材质有点像黑色那件, 有点弹性的 (A5)
- Personal expectation or judgement of the fabric
    - mostly, the type of the fabric I got was wrong, this is cheaper feeling fabric, I thought it would be more classic. Also because of the type of dress, maybe, the formal dress, but with the material like this, it's not convincing. (D4)
    - it gives a sense of jeans….my perception go to that direction. But, when I touch it, it's quite smooth….that's why prejudgment is quite important. (E2)
    - B: Why the searchability is totally different?
      A: because it reminds me another kind of fabric…. (D5)
    - 因为我觉得他可能是那种薄纱性质的材料, 黑色的. (D3)
    - because I was thinking, the jeans fabric, which is very thick, and I thought it would like that. But I got something like that, which is light and thin, and very stretchy, and all these together, make the fabric the different than I thought, all these are different. (B1)

Influential factors for perception

From the visual perspective, certain factors are more influential to lead viewers to the previous shopping experience.

- The texture of the fabric
    - it looks like a jeans, the pattern, but it's not.
- How the fabric interact with human body
    - Collarband
    - Wristband
    - Waist

        - A: The model one, here you can't see a lot of detailed, here you can see how it interacts with model. this is a just black outline, with model, you can see a lot more there. (D2)
- Drapes and wrinkles of the presented dress
    - maybe because of the wrinkles on the pictures, I got them better
    - 我能看出来它是非常软的, 因为这些褶皱……(B3)
    - I always like to see the falls on the model picture. But because it is black, you could see too many details here. (D2)
- Visualized information is prefered
    - I prefer the detailed material pictures than the scales. The scale makes me to read, but I just like looking pictures.

Some external factors are influential to the understanding the fabric or product

- Lighting have strong influences on the perception of the glossiness
    - A: I would say, for this one, I saw more glossiness…...maybe, I would say, it's also about the setting about the light….here, the lighting is a little bit harsh. (C4)
    - And it looks that it has some shinny effects, because of the model picture, because of the lighting (A2)
    - And the glossiness, especially, on the picture of the model, it's quite glossy, because of the lighting, here, if I have it in my hand, it's not glossy at all. (B2)
- The expectation of the product price
    - The expectation of the price influences the imagination of the thickness, transparency
        - and for this one, I expect, the feel is different, because you also judge it on how expensive. For expensive, I may expect thicker fabric, for the cheap one, I expect thinner, more transparent….

What is the impression for the 5 dresses?

Dress A

- With material knowledge of the jersey, the wrong perception goes to the very thin fabric.
- Without the video, the impression of the dress is thin, light, fragile and shiny, which looks like a normal T-shirt.
- With the video, the impression of the dress is thick, stiff and shiny.
- The overestimated glossiness is caused by the lighting
- The perception of thickness, glossiness and fragile is easily to be wrong
    - I see the jersey, I know this material, so it points me to the jersey, that kind of fabric that I know, mostly it's a bit glossy, and light weight, and it's like quite transparent. (1)
    - A: 我没想到它那么厚, 我以为是那种特别薄的, 就想秋衣一样.
      B: 你从哪里看出来它薄的?
      A: 就是有很多褶子啊 , 然后这种材料就感觉是那种薄薄的衣服. (1)
    - I saw it was jersey, I just very get used to…..it usually feels very…pretty weak.(1)
    - the color, because, it looks like some kind of sweater, because it says it is cotton. And it looks that it has some shinny effects, because of the model picture, because of the lighting and, here it looks more plain. (2)
    - The fabric, it just looks like a normal t-shirt fabric. (3)
    - It's more stretchy than I thought, I thought it is like a T-shirt. (4)
    - 这件差别比较大, 因为我之前看的时候是那种带闪的那种, 而且感觉材质有点像黑色那件, 有点弹性的, 所以它的上身效果应该会比较凉, 弹性更好的那种, 包括光泽度会更好一点, 从图片上看, 就是这个感觉. 然而当我拿到衣服, 和我想象的差别比较大的. (5)
    - Here, I thought it is quite stiff (5)

        - I thought it was quite thick and stiff, so that also made it quite heavy (5)

Dress B

- The general impression of the dress is a rough jeans dress.
- Without the video, the impression of the dress is thick, stiff.
- With the video, the impression of the dress is limp and it is shiny.
- The perception of thickness, roughness, stretchability and stiffness is easily to be wrong
    - I first, just look at the whole things, and I just thought, it's a jeans, kind of dress, and I assume, it likes a jeans, and quite rough, but I know that the jeans dress are softer than pants. I take that into account, but still, it's a jeans. So, it's not stretchy, quite thick and warm fabric (1)
    - 因为一开始从图上看, 我觉得是牛仔布料的, 所以我觉得它的硬度应该是比较大的 (1)
    - I thought it's kind of jeans, because of the color, and also the pattern. And, when I see the picture of the fabric (detailed material picture), I thought it should be quite thick. But, after I touch it, the stretch ability is quite nice, and I would say, the fabric is not that heavy, and it is not like what I thought, also the roughness. At beginning, I thought it could be jeans, and it would be rough, but it's quite smooth. (3)
    - I thought it would be stretchy, but it is not stretchy at all. I thought it would be thicker, but it is very thin, it's not jeans. (3)
    - 第二件因为看起来像是牛仔的, 又是深色了, 就想象要厚一些. 但是视频又觉得比较飘动, 就觉得是那种没有那么厚的牛仔. 但是实际拿到手上是非常薄的. (4)
    - This was kind of strange one……I thought it was like jeans, thick…..after I see the video, I found it is a flexible material, not stiff at all…..Then I read the text, and I found it is a material that I didn't know, then I don't know what should I expect. I could see that I saw on the video is different comparing with what I expected. (5)
    - I thought it is a more rough dean. on the video you also get it is not that rough, on the pictures you see it is very rough. (5)

Dress C

- The general impression of the dress is a soft, thin and not stretchy dress.
- The perception of thickness, stretchability and glossiness is easily to be wrong
- The pattern makes the surface of the fabric feel rougher than it should be
    - 软软薄薄的裙子, 感觉不是很弹, 不太能拉伸. (5)
    - because of the layers, I thought it is two layers, and wasn't, it is just really thin. (1)

Dress D

- The general impression of the dress is diversiform and conflict.
- The black color makes the detailed of the dress hard to be perceived.
- The perception of thickness, stiffness, stretchability and glossiness is easily to be wrong.
    - I thought it was quite thick and heavy (2)
    - 这几张图就让我觉得, 薄的, 软的, 有很能拉, 就让我觉得是比较薄,比较软又有弹性的料子. (2)
    - 因为我觉得他可能是那种薄纱性质的材料, 黑色的.(3)
    - yes, I think so. My mum has something like this. I thought it was really thick fabric (2) I don't know why, but I just expect that this is a more stiff and shiny fabric. Ummm, plastic…(4)
    - I thought it would be like this, quite solid, which is a very light fabric, very thin and stiff, no-stretchy. (4)
    - I would say the fabric has some structure, here, it totally loose, and also, it would not be that thick, and not be that heavy…..(5)

Dress E

- The general impression of the dress is a stiff dress.

- The structure (white lines) on the surface of the fabric is confusing, which may influence the perception of thickness, stiffness and roughness.
- The perception of thickness, stiffness and roughness is easily to be wrong
- Zip is hard to perceive, which influences the understanding of the fabric
    - I can immediately see it is a stiff fabric. Then I know it won't lose shape. (1)
    - I also have the dress like this, it's also have this stripe. In my own fabric it's quite thick, and it gives a sense of jeans….my perception go to that direction.(2)
    - 我当时其实没有想到这个布料是这种硬的, 看起来是那种软一些, 还很轻的 (4)
    - Especially, due to the video, it seems quite stiff and thin, because it is really a blouse fabric. (4)
    - I thought it is one smooth fabric, but here you can see it is on top of it. (4)
    - but I didn't understand, because of this white line, because it is thinner fabric with the white line inside makes it stiffer, but I accessed it is a thick one. With the white lines, it is as the same as I thought. When they are together, it is just a thick fabric.
    - maybe the zip, because there is a zip on the back, but you even don't see it in the video. This dress doesn't even need a zip, but now I understand, to show how it open, sometimes also shows how interacts with fabric. In that way. (5)

Missing information about the dresses

- How to iron
- Detail description of inside layers
    - A: most one, is, inside skirts, because if I would see the inside skirts, I would assume that the outside skirts is thinner. The lines. Because with it, it makes it very heavy, but without it, it is just a thin and light dress.

Presentation methods

Presentation preference

- The video of model and the video of hands interacting are preferred comparing with the extra detailed material photographies or scale references.
- For material understanding, the video of hands interacting is more useful comparing with the The video of model.
- For getting the impression of the dress and trigger the interests, the video of model is prefered comparing with the video of hands interacting.
- The extra detailed material photographies or scale references
    - If participants prefered visual information, they would think the scale references have too many to read.
        - For the scale references, it is handy, but it has a lot of text, and I don't like reading text, so I don't think that handy for me.
    - If participants looked for certain characteristics or attributes of the fabric, they would prefer the scale references
        - it was help for on the product that I'm goanna guess. Especially, for the qualities that I found hard to access on the pictures, like how thick the material was.

Photographies

General opinion about the product photographies and the photographies of model wearing the product

- **Comparing with the product photographies, the photographies of model wearing the product is more informative and preferred.**

        - but you basically get color…even though it is a little bit deeper here. And you notice that it's not transparent, it's not glossy, and you do, and the thickness and weight are hard to judge here. And staffs like roughness and softness. **For the second one, this one feels very similar to the first one. (B2)**
        - B: 你觉得这两个图信息有重复么? (模特的图和只有产品)
          A: 我觉得信息有重复, 我就比较喜欢看模特身上的图, (B3)

Opinion about the product photographies

- Positive opinions about the product photographies
    - looks more realistic
        - for the material, this one looks more realistic (the product), the lighting, no shiny, the model one makes you feel you can wear it to some business meeting, but the product picture feel more like an old style. (A2)
- Negative opinions about the product photographies
    - Too flat
        - The second one (product photographies) is too flat, literally you cannot see any details from that. That's why the model one is the way more better.
    - Not informative for the black color
        - A: I would say the different could be, only the pictures of product, it's not that informative, the color is black, and comparing with the picture with model, it's a little bit hard to see, where is the opening…(D5)
        - A: 主要这个黑色的模特图就看着乌漆麻黑也看不出是个啥. (D)

Opinion about the photographies of model wearing the product

- Positive opinions about the photographies of model wearing the product
    - More informative comparing with the product photographies, because it shows the interactions between the fabric and the body. It might show more fabric movement, which is better for the material understanding.
        - A: I think I prefer with model because it shows more about how it looks on someone's body. even though she doesn't have the same body as you, you can see how it falls. (B2)
        - A: 还是第一个(模特), 我就是比较喜欢人穿起来的感觉, 因为光是那个实物, 你就看不出来他的具体的剪裁或者穿在人身上的感觉, 如果穿在模特身上, 你就会看出来它的肩宽啊, 腰围啊这些. (C2)
        - A: the model one, for sure. Because it shows how the fabric falls on the model's body, it's very important for me. Just to see how it fits. For the fabric, also, just more impression. (C4)
        - A: The model one, here you can't see a lot of detailed, here you can see how it interacts with model. this is a just black outline, with model, you can see a lot more there. (D2)
        - A: I think I prefer the model one, because you can compare it with the skin color or something, and it's a little bit more in-context (B1)
        - A: definitely, model, here, it needs to fit your body perfectly, and here you can see the fabric falls around the wrist, how it is, when it is a little bit wider. And, here, if you see it without the model, it doesn't show anything. (A5)
        - A: I think the model one, because you see more about the fabric and how model interact with it. (D2)
        - This helps more to the fabric (model), because if you do how it moves in certain way, you know it is stretchy or not, if it is stiff. It will give me more information comparing with the pictures only with products. (C4)
- Negative opinions about the photographies of model wearing the product
    - More informative means more possibilities of wrong assumption

        - With the model, it gives me the best impression of material, but then, it also gives me more negative assumptions. For the material, it's more informative, but I also have way more assumption, bad or good, most of time bad, and then, probably doesn't meet my assumptions, in that sense, it makes me feel it is the better option, but I don't think it is right.

Opinion about the detailed material photography

- Positive opinions about the detailed material photography
    - More informative for the pattern or structure of the fabric
        - Actually, it is nice, because it shows more about the patterns, it's more about the textual. (C4)
        - A: 但是我能理解你为什么放那个细节图, 因为这个就不是普通棉线那种, 平针嘛, 它是这种织的. (B3)
        - 这张细节图你可以大概看出他的那个纹理, 还有他大概布料的感觉, 还是有一定的信息量. (C2)
        - A: I can see the structure with lines (E4)
- The detailed material photography may lead to wrong assumptions of the fabric
    - The size of the photography is hard to estimate, and the close view of the texture might lead to the wrong perception of the roughness, which might cause the assumption of the fabric type
        - especially for this (detailed material picture), it just look rough, like jeans. So, it gives me a wrong image.
        - Not really, because the color is so different, so what is the real color, and because it is so closed-up, and I don't know it is one centimeter, so what's the size, or how rough it is. (B1)
        - 太细节了之后反而会有误解, 因为他不知道你这个图取的是多大的, (A1)
        - A: 因为一开始我以为他是那种雪纺的布料, 因为雪纺的布料摸上去会有那种颗粒感…… 因为你这个取景取太小了(细节的材料图片). (D5)

Textual information

- Some participants subjectively skipped the important information related with the material.
    - Participants don't care about the textual information because they don't like reading or they think it is time-consuming
        - A: I just quickly read it. Normally, when I shop, I don't read any text, actually.
        - B:这些(文字信息)你都看了吗?
          A:这些我一般都只看前两句话.
    - Participants think it doesn't have rich information
        - A: not that much, because here it says some features, but all those features, I saw on the picture, and because you have texture, but it says smooth quality, but when I see the pictures, I could only reference something that I do know. And, polyester, I don't know too much. (C1)
    - For certain fabric, participants didn't understand the exact meaning of the material information.
        - B: 这个词说的是一种特殊的牛仔你知道么?
          A: 不知道…..就是所有不认识的单词, 我都认为他们是一种化纤材料.
    - Skip important information, such as lining, which might lead to the wrong perception of thickness and weight.
        - I didn't really see the description.
        - It said in the text, but I didn't pay the attention on it……
        - B: 但是你没看到这个, 它是有里子的嘛? Lining, 这个信息.

A: 我没有看

- Opinion about the machine washing
    - Information of washing temperature is useful and needed
        - A: well, everything can be washed in machine, if it says it only could be washed in low temperature, that will say more about that. Then you know there is a risk about shrinking.

    - The fabric is not too fragile, which does not need the extra caring.
        - A: 看了. 就感觉棉的就应该是那种比较软的. 也不会像衬衣的料子是那种滑滑的. 然后, 所有能够机洗的衣服, 都感觉挺…..耐操的. (A1)
        - A: I would say, it's not that fragile. It's strong enough to put in the washing machine. (A1)
        - it is not a difficult material. So, you can just put it in the washing machine, which means, no weird things….
- Directly look for certain material or information
        - A: Yes….but normally I escape from the 100% polyester, because it becomes very hot. but I have a lot of polyester clothes.
        - you can look for certain materials. For example, some people want to find a cotton like, then you can just skip this.

Scale references

- Subjective judgements are more convinced and prefered comparing with the information getting from the scale references
        - A: 我觉得他比我想的要硬挺一点, 因为他那个照片看起来…这两个和我在看图片的感觉抗衡.
          B: 这个表里面要硬一些, 但是你不信?
          A: 对, 因为他这个也没有放到非常硬的程度, 居中的话, 我比较 会偏好相信自己脑补的东西.
        - B: it's already tell you the material is quite thin, and very limp, did this influence you?
          A: Not that much, I would say. I have already had the picture in my head
        - I actually see the scale references first, but I also check with the photos, because I don't think they are right.
        - 因为他这个也没有放到非常硬的程度, 居中的话, 我比较 会偏好相信自己脑补的东西.
        - Some are really objective for me, what do I think is smooth, what do I think is rough, that's why, I feel a little bit weird. I don't believe that my opinion
- Scale references are more useful for the attributes that are hard to perceive from pictures
    - Thickness
    - Transparency
    - Stretchability
        - it was helpful than just having pictures, so it was help for on the product that I'm goanna guess. Especially, for the qualities that I found hard to access on the pictures, like how thick the material was. (E3)
        - B: 你喜欢这种产品展示的方式吗?
          A: 我觉得这个表还挺好的, 有些东西, 比如说透不透, 有没有弹性
        - If you have pictures, but you want a stretchy dress, this will be very handy. So, you are looking the pictures, but you want it stretchy, then if you look at this, it is very useful. (E3)
- Positive opinion
    - Informative and precise
        - I would say, I quite like it, it's informative and precise (B3)

- Negative opinion
    - The scale references are useful and interesting, but hard to read. Better style is needed.
        - The scale makes me to read, but I just like looking pictures.
        - but again, it has a lot of to read, and it is easier to look at the picture, so. But it is handy if you want to know what the fabric like.

The extra detailed material pictures

- Positive opinion
    - More information about the texture, which is commercially prefered
        - I like them, because you can see they are movable, if you see this picture, you see it is more limp, and because of the flat detailed picture, you just get the color. (D2)
        - but maybe this one shows a little bit better, the product picture gives a little bit more sense about the thickness. (A2)
        - the extra detailed material pictures, I really like them, because I think they are commercially success, it looks so rich with texture. Grab my attention. (B2)
        - because you see how it finished, something about the quality of the product (E)
        - B: does those pictures give you more understanding of attributes?
          A: I would say, maybe about the thickness of fabric. At beginning, I thought it would be thick, but after I saw this picture, I thought it would not be that thick.
          B: the edge of the material?
          A: yeah (E)
- Negative opinion
    - The photography of the stretched fabric is hard to understand
        - A: 然后这个是啥意思呢?
          B: 基本上就是说弹性, 基本上没什么弹性……当时没理解是吗?
          A: 没有
        - B: What do you think about this picture? (the stretchable one)
          A: I didn't understand this picture.
        - B: for the third one, what did you got.
          A: I didn't get many…..it seems talk about searchability, but it doesn't work very well.
        - A; this one is about stretchy, I have already got from elastane. So, I didn't really look at this one, because it is not super clear, and the fingers are covering a little bit when it's stretched.
        - B: what you get from the third one? (stretch)
          A: I don't know about it, I just thought it is ugly…..I didn't get the stretch ability, because it doesn't move.

Videos

- Videos are more informative than the photographies, which is better for the material understanding because it provides more angles, movements and interactions with the body.
        - B: do you think those pictures are useful? (detailed material pictures)
          A: yes, you can see how it falls, how ……
          B: how do you think of it comparing with video?
          A: Video would be extra, but it is already nice.
          (show her the video of hands interacting with material)
          A: yes, on this video it looks softer and lighter….
          B: you think the video is better comparing with those pictures?
          A: Yes
        - I would say, the video is more informative. You can see, like, when the fabric is moved, it reacts to the real thing.

        - 然后就是动态的视频比照片要好, 因为动态视频可以看这种角度, 以及具体的效果,而不是某个视角.

- Positive opinions about the video of hands interacting
    - Better for the material understanding comparing with the video of model, because it shows more aggressive movements about the material
        - 这个视频有很大帮助, 这个晃一晃, 我起码能知道,他, 薄,软, 然后没有什么弹性.但是我无法脑补摸起来什么样子. 就感觉料子整体是滑得. (C5)
        - 对, 针对材料的话, 这个手感啊什么的, 这个会更好, (E4)
        - for fabric, to tell the fabric behave perspective, the hands one is better, something using the fabric and trying the fabric (E5)
        - A: I like one of your video…..it shows how fabric moves, and it gives you information on flexibility, thickness and seeing through as well….you could not see them from the pictures, but when it flow, it couldn't hide anymore. (D1)
        - A: I think the hands one tell the material better, definitely with the stretch, just like the other dress (E5)
        - A: I like the hands one, for the material, it shows more stretch, and it confirm my perception. Here you can see the flowing. (B5)
        - Just wearing it, doesn't show what happen, when you bend it, when you put it on. This gives more idea about it. (E5)
        - then you see it is really good in this one. This time, this one is really better, more moving, but, wow, here you see it is not a real jeans.
    - More useful for certain attributes, such as thickness, softness and roughness.
        - B:所以对比模特那个视频, 这个视频更能体现它的薄和软?
          A: 对
        - B: For the A5, do you think it is better.
          A: I think it is better for the roughness….
- Negative opinions about the video of hands interacting
    - People won't interact with the fabric in this way, and they care more about how the fabric interact with or fit the body
        - I would say, it's also better to having the video with model, because in the reality, nobody would like to squeeze or do it like this. I like how the model walk, how the fabric reacts, when you move.
        - A: this one is more informative (The video of hands interacting with fabric), but in reality, I prefer the model.
        - 我更喜欢第一个(模特), 第二个细节虽然给的比较多, 但是实际买的时候, 你更想看的是它的上身效果, 而不是它布料的感觉.
    - Certain interacting might be confusing, like twisting
        - A: 我觉得这么拧一下并不会给我很多信息……出褶嘛?
- Positive opinions about the video of model
    - Better for presenting how the fabric interact with the body
        - the video was nice. Because, it is nice to see how it behave. (E5)
        - B: What do you mean about behave?
          A: how it moves, or how stretchy it is also, because you can see the stretch on the model video better, because it fits her. In the moving hands video, you can only see the stretchy. (A4)
        - A: I prefer the model one, because here, if you she is walking, you can see the material moves, it shows thinner, and less stiff, couldn't see it from the previous video. (A5)
- Negative opinions about the video of model
    - Hard to image yourself from the model

        - but I know it very different for different persons….so, guessing it fit on me basing on another person is very hard for me…. (B)
- Prefer having both videos because they provide complementary information of the fabric
        - 我觉得获取的信息不一样. 这个一我可以获取出透不透, 但是看不出弹性.
        - I also, the combination of them will be better, and then, taking a little bit, stretchy a little bit. That kind of staffs. (D)

Perceived information from the presentations

- Product photographies
    - Most of information is overlapped with the photographies of model wearing the product
        - 这个呢他就是个黑色的,我也看不出是个什么. 而这两个(模特和产品图), 并不能给我布料的信息. (D5)
        - but you basically get color…even though it is a little bit deeper here. And you notice that it's not transparent, it's not glossy, and you do, and the thickness and weight are hard to judge here. And staffs like roughness and softness. **For the second one, this one feels very similar to the first one. (B2)**
- Photographies of model wearing the product
    - Interaction between the dress and body, for example the arm, the back and the waist
    - Comparing with the skin color of the model is helpful for understanding the fabric color
    - How is the dress sewed
        - A: 我能看出来它是非常软的, 因为这些褶皱……(B3)
        - 这个呢他就是个黑色的,我也看不出是个什么. 而这两个(模特和产品图), 并不能给我布料的信息. (D5)
        - Here is really nice to see on the model, because you can see how it falls, in side of just on a doll stand there. (D1)
        - I have already seen the fabric goes around the arms, so those pictures make me more confirmed. (C2)
        - A: I would say the fabric has some structure, here, it totally loose, and also, it would not be that thick, and not be that heavy….. (D5)
        - also from the person (model), it doesn't fall fluently, because it seems kind of stiff here (B2)
        - but you basically get color…even though it is a little bit deeper here. And you notice that it's not transparent, it's not glossy, and you do, and the thickness and weight are hard to judge here. And staffs like roughness and softness. (B2)
        - A: here, it's easier to judge(model)…what's really matter me….usually is stretch and thickness and transparency, because these easily goes wrong when you order online….and….color is pretty easy to judge here….(E5)
        - A: yeah, you can also see the model's hands on the picture, it looks very heavy. For the glossiness, I thought it would be glossy, because of from the model picture, there are a lot of light. But I was doubting, because the detailed material picture is not shiny. And the model picture is shining, so I thought it was shining. (C1)
        - I always like to see the falls on the model picture. But because it is black, you could see too many details here. (D2)
        - B: why the transparent is different?
          A: On the model picture, I couldn't see the transparence. And maybe it would be a little bit thicker. (E3)
        - and also from the model picture, it's quite stiff. (B5)

        - Well, here is the intended shape, the designer wanted (model), here you see how it actually falls, and you can see how it works and how it fits the body.(E1)
        - I can see the stiffness with the model picture in my mind, (E1)
        - But these usually you can see from the model, how it falls, how smooth it is, (C3)
        - And, it's always easier to see it on the model, you see how it there with legs, how stiff or not. (C1)
        - A: I think, you need both, here on the model, I really think it is good, then I go down, I look the neck is quite high, then I look back, I think, yeah, it is quite high. Because the model doesn't have big breast, but it is more the dress it is, not the material. (D3)
        - A: the first one, on the back, it seems a little bit stiff, and also, I think, I thought it is quite thick, because of the way, it sewed. (A5)
        - I first see how she hold it, it looks like, it is not really stretchable, and you can't see through it. Here is the girl, here is the cloth, it's better to see she wear it. (E1)
- Textual information
    - Confirm Information about the color and the familiar fabric
    - Look for certain fabric
    - Lining (Sometimes skipped)
    - Description of the fabric, such as smoothness
    - Caring information
        - A: 首先是颜色, 我觉得图片就能展现, 材料……没什么研究……(E2)
        - you can look for certain materials. For example, some people want to find a cotton like, then you can just skip this.
        - yes, but this one, you don't get more information, you don't know how stretch it (A1)
        - again….for this, I expect less….it does help, for it has the lining…but….(C3)
        - A: yes. But for, how it opens, I didn't find it's useful, because I have already seen it. I do think, tell what the material is, is useful, because I can image how material feel. Further, I don't usually use much. (C1)
        - well, first, it shows me about the stretchy, elastane. And, I didn't look that detailed to it. Because I know something about the fabric, and we can get the information form the pictures. (B5)
        - here it writes the smooth, so I thought probably, (C3)
        - yeah, I read it, I feel it is not a natural feeling dress, but I interpret to the wrong fabric. (D4)
        - The description, I think it is a little bit difficult. It is important that you can wash it in the machine, and next to it, the material, polyester, I saw it, but I don't, just read it, and I'm ok. (C1)
        - A: yes, I immediately see the elastane, so I thought it is stretchable. Because it is 5%, I didn't think it is that stretchable, when I got it, it's more stretchable than I thought. (A5)
    - Sensitive about the elastane information, but hard to estimate it without references
        - A: yes, I immediately see the elastane, so I thought it is stretchable. Because it is 5%, I didn't think it is that stretchable, when I got it, it's more stretchable than I thought.
        - I would say the different could be, only the pictures of product, it's not that informative, the color is black, and comparing with the picture with model, it's a little bit hard to see, where is the opening…
        - B: did you see the textual information, like 10% elastane?
          A: Yeah, but I'm not sure what it is…. (D5)
        - A: I think I kind of skip over it, it's hard to judge what 10% is, but I could judge it's more stretch comparing with the dress that has 5%, but I just don't really think of it. But I think it sometime has a lot of information….I think I read them, but I just didn't get from it. (D4)
    - Lacking understanding or knowledge of the fabric

        - B:那你有什么感觉呢?比如说这个90%的狄龙.
          A: 我对这些面料没什么研究 (D5)
        - 因为实际上我不是具体做这个的, 所以我对他的这种材料我不是特别了解 , 虽然它写了100%涤纶, 但我其实没有这种概念.我觉得他帮助不是很大. (B1)
        - B: did you read the textual information?
          A: Yes, I read it, but didn't understand. (B5)
        - The material, polyester, I saw it, but I don't, just read it, and I'm ok. (C1)
- Extra detailed material photographies
    - Rich information about the texture
    - Access stretchability for certain types of dresses (Dress D)
    - Thickness from the edge of the fabric
        - A: 就是那个, limp……(E)
        - because you see how it finished, something about the quality of the product (E)
        - A: yes, you can see how it falls, how ……(E)
        - B: For those kind of pictures, do you think it is good for your perception?
          A: yes, I think it is good. …..the actual information, I would say, the fabric need some irons, in order to be smooth…
          B: does those pictures give you more understanding of attributes?
          A: I would say, maybe about the thickness of fabric. At beginning, I thought it would be thick, but after I saw this picture, I thought it would not be that thick.
          B: the edge of the material?
          A: yeah (E)
        - A: 这几张图就让我觉得, 薄的, 软的, 有很能拉, 就让我觉得是比较薄,比较软又有弹性的料子. (D)
        - and in the(extra) detailed pictures, you do see a little more , it's not so stiff, but you don't know how it really falls…because you put jeans together, it also falls. (B)
        - 大概就是从这些细节图上看出来的.你就能看出来他的布料啊, 它比较轻啊,它的颜色啊, 或者说它的透明度, 觉得还……可以.尤其是这张(scrunched), 你就能看出那种布料的感觉. (C)
        - but you also see, that is quite soft and limp, but looks like a warm fabric, but thicker than the normal cotton. (A2
        - A: More about fabric, the textual, and that's the stretchable, the third one. The pictures of model and product make me feel thick, although it looks thick as well on the pictures below. (D)
        - B: for this one (the stretch), what do you get from it?
          A: oh, it's very stretchy, more stretchy than I thought.
          B: so this one change your perception but fit your real touching?
          A: yeah (D)
        - but maybe this one shows a little bit better, the product picture gives a little bit more sense about the thickness. (A2)
- Detailed material photography
    - Texture of the fabric
    - Guess the waving method of the fabric, then image the stretchability
    - Information about the pattern, but might not be precise
    - Judge the type of the fabric, for example, jeans
    - Image the roughness of the surface
        - A: 但是我能理解你为什么放那个细节图, 因为这个就不是普通棉线那种, 平针嘛, 它是这种织的. (B3)
        - because you can see the details and what kind of fabric it is. (D1)
        - but from the close up (detailed material pictures), you can see it looks like something waving. (A4)

        - And, when I see the picture of the fabric (detailed material picture), I thought it should be quite thick. (B3)
        - B: 这不是有一张细节的印花图嘛?
          A: 我没法脑补这个印花是不是粗糙的. (C5)
        - A: From this one, you only get the glossiness, the colorfulness, and the transparency a little bit. You don't get the weightiness, the stiffness or stretchiness. Or, maybe a little bit roughness or softness, but…basically the color…(A1)
        - 这张细节图你可以大概看出他的那个纹理, 还有他大概布料的感觉, 还是有一定的信息量. (C2)
        - 这张看出来面料可能有一点粗糙, 弹性会比较好 (D3)
        - 具体的花纹啊, 感觉它的拉伸效果好不好. (E4)
        - From the detailed material pictures, I didn't find it is smooth. (C1)
        - because it is flat, you can only get color from it, you don't really get a lot. (D2)
        - A: You can see more stretch, but I don't know how much. (A2)
        - Actually, it is nice, because it shows more about the patterns, it's more about the textual. (C4)
        - Because here, it looks like some old curtains, you are super rough, but this is much smoother, because this is much thinner. (C3)
        - In the beginning, because of the close-up, you saw those dull elements, but after I saw it, you see those dull elements are very very shiny (C1)
        - B: how you get all the information of this high score without believing it?
          A: here, the close-up, this is the stretch ability, you can see the way it created, it is very stretchable, and, also this way of making a dress, makes it a little heavier. On the material picture, you saw the way it weaved, it just looks soft. (D3)
        - A: I can see the structure with lines, but I didn't..on the other pictures, it is not shiny, but here, it is the most shiny part, and it's definitely on the top of the material, but I didn't see it here either. (E4)
        - it looks like a jeans, the pattern, but it's not.
- Video of model
    - Directly build the impression of the fabric type
    - How it fit the model
    - Model moving shows more angles of the dress and the changes of the lighting, which is good for access the color and the glossiness.
    - Perceive the transparency from the exposed bra (Only dress C)
    - Feeling of the fabric flowing
        - sometimes you just see the video first, don't look at all the material and pictures, after you get the feeling, then you fast go deeper to the material. (B4)
        - It shows me that it is way more lighter, it's not real jeans. Because it also matches with the description, lyocell, I know this material. (B4)
        - You can see how it fit on model, (B5)
        - A: For the glossiness, at beginning, I thought it is not that glossy, but when I see it, there are some pattern printed on the fabric, right? I think it is quite glossy.
          B: does this video help you?
          A: It helps me, but I say some pattern on it, for me, it (detailed material picture) not indicates the glossiness that much. (C4)
        - A: Yeah, I can also see that. When the model moves, as I said, I also related the transparency to the thickness, when I see it is not that thick, it is supposed to have certain transparency. (C4)
        - 但是视频又觉得比较飘动, 就觉得是那种没有那么厚的牛仔. 但是实际拿到手上是非常薄的.
          B: 视频看不出厚度吗?
          A: 没有事务那么薄……就觉得不是那种特别硬的, 因为有一点飘. 也没想到会那么薄. 我觉得这个颜色深深的会让人觉得有点厚. (B4)

        - A: 这个视频我的重点是, 这个衣服有点透, 因为黑色的内衣. 然后比刚才的视频感觉颜色亮很多. (C)
        - A: transparency, the first one on the picture, it doesn't look transparent, but here you can see the bra.(C4)
        - A: in this video, you see more colors, because the lighting is changing, so you see more color, and it's also really…light (C5)
        - A: On the video, it still looks quite thick. Because it really looks like a real dean. (B4)
- Video of hands interacting
    - Estimation on the weight of the fabric because of the aggressive movements
    - Really helpful for understanding the stiffness and the softness of the fabric
        - In the previous video (Video of interacting), you just see a little bit folding, and you don't see how limp it is
        - A: 会给我, 主要是软硬程度的信息吧,那个strechability 也是吧 (D5)
        - A: with only pictures, I would make wrong perception on the whole thing….. It makes me realize that it was something different of what I expected. (B5)
        - A: yes, on this video it looks softer and lighter….
          B: you think the video is better comparing with those pictures?
          A: Yes (E2)
        - A: I still find the softness is hard to access. I think that you can really see the weight. It doesn't flow, you can also see the stretchy more. (A4)
        - B: could you get stretch ability from this video? (hands interacting with fabric)
        - A: No. I would say, (D5)
        - I would say, for this one, I saw more glossiness, and the stretch ability also. It shows the fabric more, more than the video with model…...maybe, I would say, it's also about the setting about the light….here, the lighting is a little bit harsh. (C4)
        - A: 这个看了以后能发现它是那种很薄的牛仔衣.
          B:所以对比模特那个视频, 这个视频更能体现它的薄和软?
          A: 对 (B4)
        - 这个视频有很大帮助, 这个晃一晃, 我起码能知道,他, 薄,软, 然后没有什么弹性.但是我无法脑补摸起来什么样子. 就感觉料子整体是滑得. (C5)
        - A: 有点像床单的那种感觉(hands interacting with material). (E4)
        - The video have changed my perception, but I when it in my hand, it is even softer. (B5)
        - for example, when she does it, it doesn't fall back, so I thought, it would be a thicker and stiffer dress, but I didn't understand, because of this white line, because it is thinner fabric with the white line inside makes it stiffer, but I accessed it is a thick one. With the white lines, it is as the same as I thought. (E5)
        - A: if you see she wrinkle like that, you can see the bottom has two layers, thicker than you expected, and when she moves, you can see the under skirts a little bit. Because, there is nowhere, said about double skirts. (E4)
        - And, it looks quite fragile on the video, it's so moveable, but when I see it, it's ok. (C5)
        - A: I think this one helps(video), because it shows not stretch, and quite stiff, and then, (E5)
        - B: 你觉得这个视频呢?能帮你么?
          A: 有一些吧, 但实际上你对他的厚度, 重量, ,没有直观的感受. (A5)
- Un-matching information between different presentations make viewers confusion, then they would believe their first impression or the previous similar experience of the fabric
        - I do feel, if you look at the first two pictures of the whole dress (model and product pictures), and look at the close-up, it doesn't really match, here, the color seems way more fake, and here, it seems real enrich, and then, I don't to know what to expect.

Attributes

Influential attributes

The certain attributes of the fabric are more influential when viewers perceive the material, or they consider more about these specific attributes, which means those attributes are more influential on their judgements of the fabric

- Thickness
    - Thickness is the starting basement of the fabric estimation
- Softness
- Stiffness
- Glossiness
- Transparency
- Fragile
    - The fragile is estimated through the caring information, which influences the durability of the dress.
- Stretchability
    - The stretchability influences the estimation of the dress fitting situation.
        - Fragile, if I can put in the washing machine.
        - The stretchability is quite important when you wear it. (D5)

How viewers perceive each attribute

- Coldness
    - Imagination based on the fabric type
        - A: 因为看着像牛仔的, 就感觉摸上去会是凉凉的. (B)
        - A: oh, it just likes the sweater, so, feels warm. Maybe also the color of it. (D)
- Fragile
    - Link to the clothes pilling
        - A: 一开始我以为它会起球. (脆弱联系到了起球)
    - Imagination based on the fabric type
        - A: Because I make clothing by myself. I thought it might be more loose fabric,
    - Link to stretchability
        - Because at beginning I think it is light, and also a little bit stretchy, and I think the stretchy thing is easy to break.
- Glossiness
    - Based on the pattern
        - there are some pattern printed on the fabric, right? I think it is quite glossy. (C4)
    - Based on the reflection
        - 这个图上我看是有一点点反光的, 而实际拿到料子一点也没有, 雾面的. (A1)
        - 就这个图……不知道你是不是打了反光, 就这样看非常的反光. (D2)
- Roughness
    - Based on the pattern
        - maybe because of the picture (the detailed picture), there are a lot of fine textures, just the pattern, also in a line, it makes me feel rough (C2)
        - 看起来感觉应该是滑的, 但是他这个上面有图案嘛, 但是图案摸起来是粗糙的. (C4)
        - because I saw it is one material, but then I know the lines on the top of it, so it is rougher than I expected
    - Based on the textual information

        - So, here it writes the smooth, so I thought probably (C3)
- Softness
    - Imagination based on the fabric type
        - B: and what about softness?
          A: it's not like a fluffy sweater. (D2)
    - Based on the interactive feedback of the fabric, such as squeezing
        - A: when you squeeze it, it doesn't give anything, so I usually just, when you squeeze it, something just bounces or something, but this one just not do anything, so it just moves with it, that's it. (C3)
- Softness
    - Imagination based on the fabric type
        - B: 那这个stiff为什么差这么多? 主要是因为是牛仔?
          A: 对的
    - Based on the shape of the dress (Loose or tight)
        - and the dress is a little bit loose, so I can see the stiffness. (A5)
- Stretchability
    - Imagination based on the fabric type
        - It might because that, when I look at the video, it makes me think of the first dress, so just based on the previous experience. It related me to some stretchable material. (B5)
        - because it reminds me another kind of fabric….
        - I thought it is like a T-shirt.
    - Based on the pattern or waving method
        - 具体的花纹啊, 感觉它的拉伸效果好不好. (E4)
    - The wrinkles on the pictures
        - maybe because of the wrinkles on the pictures
- Thickness
    - The wrinkles on the pictures
    - Link to the stiffness
        - 厚度我是从……这种皱褶的地方……我就觉得它挺厚的……这个厚跟那个什么limp, 也是联系起来的嘛……所以我就觉得它是比较厚又比较能撑起来的材料 (E2)
        - because if it is jeans, the thickness should be, like, much thicker than the fabric I touched (B3)
        - 就是有很多褶子啊 , 然后这种材料就感觉是那种薄薄的衣服 (A1)
        - the thickness, I also watch how it falls….(C1)
        - because of the model picture, the lining, and wrinkles, (A2)
    - Based on the sewing
        - the thickness is the sewing (E5)
    - Imagination based on the fabric movement
        - if you she is walking, you can see the material moves, it shows thinner (A5)
    - Based on the inside texture
    - The edge of the dress
        - for the thickness, there are some texture inside, those are the thick staff (A2)
- Transparency
    - Wrong estimation because of missing the information about lining
        - I didn't see the lining at beginning, I was a quick reader, now I saw it. So, I didn't expect it to be there. (D1)
    - Imagination based on the fabric type
        - I make it based on my previous experience. It makes me link to this kind of materials which I expected to be thinner and more seeing through. (D1)
    - Put fabric under the light

        - Because, in my way, if you put it under the light, you can see the light, for me it is transparent. even it is not like a, see-through fabric. So, for me the transparency is like the density of the fabric, not like, it will be see through or not. (A1)
    - Interactions between the fabric and the body
        - when I saw some part of body, and the fabric is not that thick, it can also refer me to the transparency. (C4)
        - 这个视频我的重点是, 这个衣服有点透, 因为黑色的内衣. (C4)
- Weight
    - Wrong perception caused by missing the information about lining
        - B: 这个重量为什么会差这么多呢?
          A: 这个主要是被里衬影响了, 我本来觉得没这么重 (C4)
    - Imagination based on Interactions between the fabric and the body (Model catch the dress)
        - you can also see the model's hands on the picture, it looks very heavy. (C1)

Influences between attributes

- Thickness and roughness and softness
    - Thickness of the dress, because then I know how soft and rough,
- Thickness and transparency
    - when I saw some part of body, and the fabric is not that thick, it can also refer me to the transparency.
    - and I also get thickness from transparency.
- Thickness and stiffness
    - 这个厚跟那个什么limp, 也是联系起来的嘛
    - I think the material is stiff, to me it also feels thicker.
- Thickness and Weight
- Thickness and fragile
    - 我没想到它那么厚, 我以为是那种特别薄的
    - I thought it would be thinner, also lighter.
    - thickness, and the weight is related
    - I don't know, I thought it was quite heavy, and that I match.
    - The thickness is the sewing, and the weight combined with that as well,
    - Those are the thick staffs, and that makes it heavier as well.
    - I thought it is quite thick, and it's looks heavy, because it looks thick.
- Fragile and roughness
    - The rough material feels having more density, which makes it feels less fragile
        - At first, I thought it is not that fragile, after touching it, because it is smoother, and the fabric it not that density, that's why…… (B)
- Fragile and stretchability
    - the stretchy thing is easy to break
    - If it could be stretched a little bit, it won't break easily.
        - Also a little bit stretchy, and I think the stretchy thing is easy to break. (C)
        - Because of the elastic ability, if you can stretch a little, it won't break easily. (D)
        - Stretchy usually helps with the fragile.

- Stiffness and roughness
    - because it not feels smooth, so I thought it would be stiff.
    - because if it is stiff, I also think it is a little bit more rough.
- Stiffness and weight
    - Because it looks stiff, so I thought it also should be heavy.

- Transparency and stretchability
    - if you can really stretch it out, you can see through it.
        - for the stretchy dress, it has possibility that stretched too much and become transparent. (E)
        - And, when it is more flexible or stretchable, you can more easily see-through it. (B)
- The fabric weight is hard to be isolated from the product weight

Hard to perceive

- Thickness
- Stretchability
- Weight
- Coldness
- Stifiness

Considerations while purchasing dresses

- Thickness
- Transparency
- Stretchability
- Color
    - Glossiness (Personal preference)
- Comfortableness
    - Softness
    - Stifiness
- Style
- Certain type of fabric
- Fit the body (Size)
- Machine washable
    - How hard to care
- Price
        - 颜色, 款式 ……其实我对材料没什么要求……
        - I don't care too much, because I just want cheap dress.
        - transparency is very important, also stretchiness, about the fit. The color after the long time washing. ….If it feels good, if it is comfortable.
        - I found, when shopping online, it hard to find the clothes fit my body, because I have a strange body type.
        - A: For me, not that transparent, not that thick, because it is related with comfortableness. And, I personally don't like glossy things, it is supposed not to be that stiff, yes, I prefer soft fabric.
        - For me, not that transparent, not that thick, because it is related with comfortableness. And, I personally don't like glossy things, it is supposed not to be that stiff, yes, I prefer soft fabric.
        - 款式, 价位, 耐久性
        - what fabric it is, because I don't like polylactic. And, think about my body shape. And also read review, then you can know about transparence.
        - If one dress, although the material doesn't match your expectation, if you still like the style, you can still work with it. The black one is just too cheap. Generally, when I buy a dress, I look at the shape, and how the dress work on me. Then I look at the material. How the material work for the style.

        - A: when I shop online, I just want to get the dress I want. And color, and I looks cool.

Improvement for the presentation method

Photographies

- Present product in special conditions
    - Put flat on the table or hang on the wall, which gives different feelings to the viewers comparing with the photographies of the model wearing the product
        - 而我(如果看只有产品的话),更喜欢看平铺在桌子上或者挂起来的....我觉得你就应该加一些这种挂起来的照片, 会用不一样的感官和感受嘛
    - Provide the photography of sitting condition
        - If you provide the pictures of model sitting down. I think it gives a lot of information about how it works, like thickness and stretch ability.
- Provide the photography of multiple lighting conditions
    - Show the photographs from different lighting situations, such as sunlight, warm indoor light, cold indoor light.
        - 你展示照片的时候,可以写上这是什么光源, 比如说, 日光, 室内的光, 冷光,或者暖光……
        - show the inside, then you have more estimation. Again, with the lighting, outside pictures are always better, I think.
        - even better if model is outside, not in studio, sunlight or something, then you would have real world, environment, and it's easy to connect with the color of trees.
- Enphase the intricate and confusing attribute of the fabric
        - 这个图看起来像牛仔的嘛……牛仔一般都比较硬, 那这个图就可以主要展示它软的部分(For special type of dress)
- Provide the photography of the inside texture
        - so, if you have those close-ups, they are really valuable, especially this one, but I don't know where it is. For example, if you have a model, them you can zoom in, then you can see where it is, but here, if you scroll down, you don't see that much. So, I think that will be an improvement.
        - maybe a little bit more close-up, like this kind of things, like drapes……how the fabric looks like in the close-up.

Textual information

- The position of the lining
        - 我觉得也应该写一下里衬在哪……因为我们女生会关心, 到底是在上面还是下面
        - I think the information should be short enough for viewing through.
        - the stiffness and stretchiness are hard to judge…so maybe write something about these. (B)
        - It might say it's light or something, but it also didn't say here. If it says, it is a light fabric, because now it looks quite heavy. (B)
    - Temperature of washing
        - A: well, everything can be washed in machine, if it says it only could be washed in low temperature, that will say more about that. Then you know there is a risk about shrinking.

Detailed material photographies

- Describe the size of the cropped part of the fabric. For example, One square decimeter.
        - 所以他不知道你这个针线是多粗的……要不然你可以标上你这个取的是多大的材料.

Extra detailed material photographies

- Add a side view of folded fabric to show the thickness and stiffness.
    - 我就觉得他的材质没有被这个图片展示出来. 这个材料本身是很软的, 我觉得可以拍一张叠起来的照片
- Give more illustrations of the stretched fabric photography, such as big hand movements and arrows showing the moving direction.
    - A: I don't see it from here, it has no movement.
      B: but it's already moved.
      A: But there is no describe, now is pull, so you don't see that. (E)
    - Maybe a little bit, you can't see how far it is, from the video, you can see it, but here you cannot see it. If you see more wrinks, you can see more of that. It's also about your strength you stretch it. (A)
    - When there is a printing on it, that will be good. (A)

Scale references

- Less amount of the scale segmentations. For example, for the stiffness, only provide 5 segmentations of the scale: very limp, quite limp, normal, quite stiff, very stiff
    - B: 我觉得这个档有点多了.
      A: 我觉得三个就行. 反而选择更多的话, 就不知道和什么比较了.
    - 我就感觉这个东西就是给用户一些印象, 你就告诉他这个是偏薄了, 或者是偏厚了, 或者是中间的.
- Better visualized
    - (the scale reference) but the infographic is too hard to read. As a customer, when you look through the website, you don't want to spend that much time to understand, what is this, what is that…..you need have some infographic to…guide it.
    - A: maybe more detailed pictures? To explain the certain attributes, like the limp, just show how it is limp. So, everything, show the pictures with it, makes it more understandable.
- Give a referenceable and familiar fabric to compare.
    - 你可以给一点参考……你可以找一件普通的白衬衣进行对比, 先说这个是怎样的……我觉得要先给用户一个scale, 让他知道和什么比较.
- More distinctive attribute segmentation
    - I feel the soft and smooth are kind of similar, you didn't really know them….they are almost the same thing.
- Missing attribute
    - Glossiness
    - Fragile
    - Flow
        - Flow, when you walk, how it flows. Because it also gives the feelings how light it is.
        - Glossiness is often wrong on pictures, so if you have scale reference, I think that will fit best, colorfulness can really work well with the close-up pictures, I think that will be a good solution. I think for those things, the scale references will be the best solution, because the weight, thickness, those things you can't get from the pictures.

Video of the model wearing the product

- Show a position of sitting on the chair
    - Maybe I want to know how it looks like when you start sitting, because it looks very ugly.
- More aggressive movement

- maybe on the model, she can also pull her cloth, to show how stretchy.
- A: maybe the model can touch the dress more, do more aggressive movements.
- I will definitely change the lighting here, it looks very very wrinkly, on the video. (E)

Video of the hands interacting with product

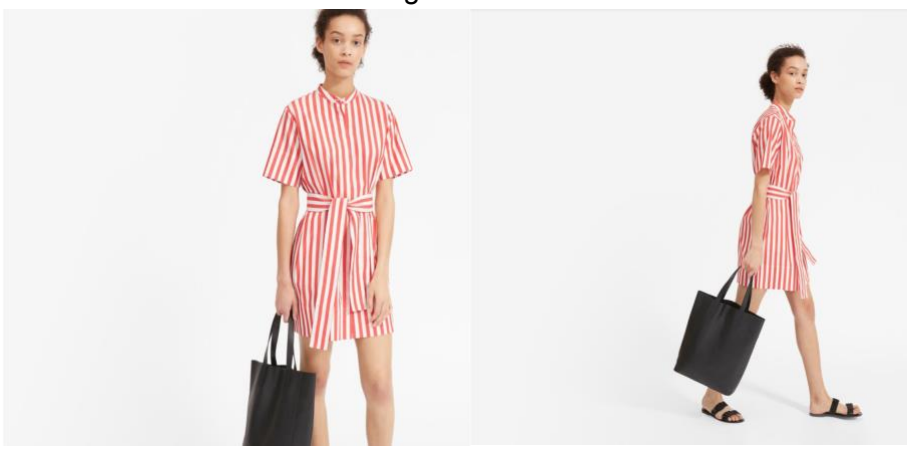
- Stretch or squeeze the fabric slowly
  - A: 我觉得这么抖我觉得挺好的, 我觉得就能看出来比较软, 然后这是反光的……我觉得可以这么拉一下
    B: 我拉了啊, 一开始
    A: 但是你拉的太快, 谁知道你是在抖还是拉, 你可以弄个慢动作, 然后再放一个比较细节的.
  - A: 还有你这个拧的也太快了, 而且没有之前和之后的对比, 可以弄个慢动作什么的. 我觉得可以先给一个大概的, 然后你再加几个细节的, 比如说出不出褶子.
  - A: It is very nice to see that on the body, because if you just wave like that, you couldn't do that in real life, only if you put it in washing machine….so this is more valuable than the waving. But it would be really nice that it is wrenched, because you see it, it is very straight afterwards. So, you know it is easy to handle. But if you do wrench like that, that is too much, it won't happen in the real life. Maybe you just folding…(C5)
- Show more about transparency
  - Put the fabric under the light
    - 透明度的话, 对着光照一下? 或者后面垫一个黑色的东西什么的.
- Use a hanger to present
  - A: put it on a hanger, and move it a little, and I think that would be better, because now it is folded double, it looks a little bit stiff.
  - maybe the zip, because there is a zip on the back, but you even don't see it in the video. This dress doesn't even need a zip, but now I understand, to show how it open, sometimes also shows how interacts with fabric. In that way. (5)

Appendix. E

Photography

Overview of product worn by model

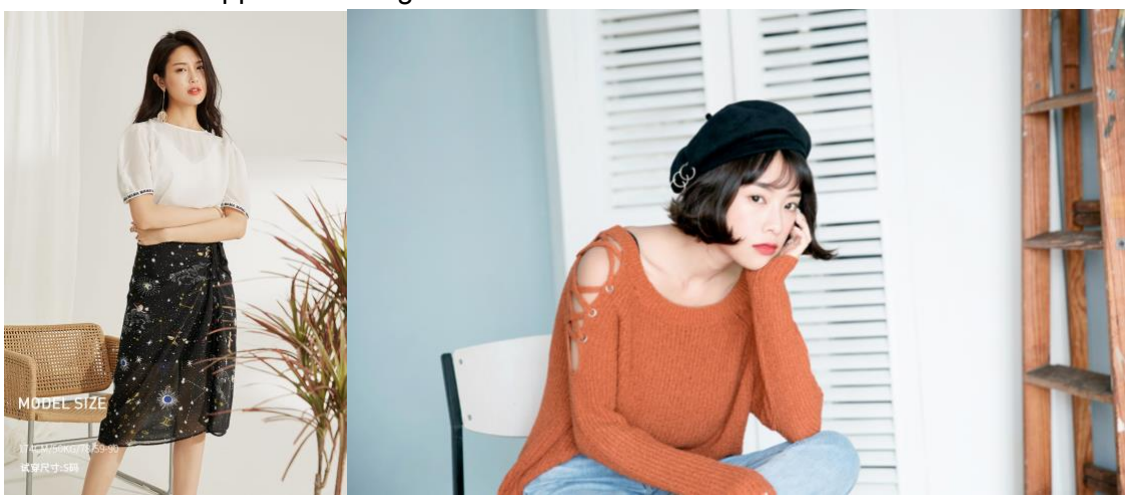
This presentation method shows that product is worn by the model in nature postures, and the intact product could be viewed. The background of the photography has a single colour, and in most situations the background is white.



https://www.everlane.com/products/womens-cotton-collarless-belted-shirt-dress-red-white?collection=womens-newest-arrivals

Overview of product worn by model in with real environment

This presentation method shows that product is worn by the model in nature postures, and the intact product could be viewed. The photography is taken in a real environment, which could be a indoor setting or outdoor environment. This presentation method is popular in the Chinese online apparel retailing websites.



https://detail.tmall.com/item.htm?spm=a220o.1000855.w4004-14867889443.29.5c14d9c5eM36VE&abtest=_AB-LR129-PR129&pvid=37df674f-703f-4970-9975-99b5f83635d2&pos=10&abbucket=_AB-M129_B4&acm=03130.1003.1.701602&id=571342740035&scm=1007.12929.25829.100200300000000

http://www.handu.com/goods-1062750.html

Close view of product worn by model

This presentation method shows that product is worn by the model in nature postures, and the product could be viewed more clearly when showing the part body of the model. The background of the photography has a single colour, and in most situations the background is white. This presentation is achieved the zoom-in function of web technique in most situations.

https://shop.lululemon.com/p/women-shorts/Train-Times-Short/_/prod8555413?color=LW7ADPS_033105

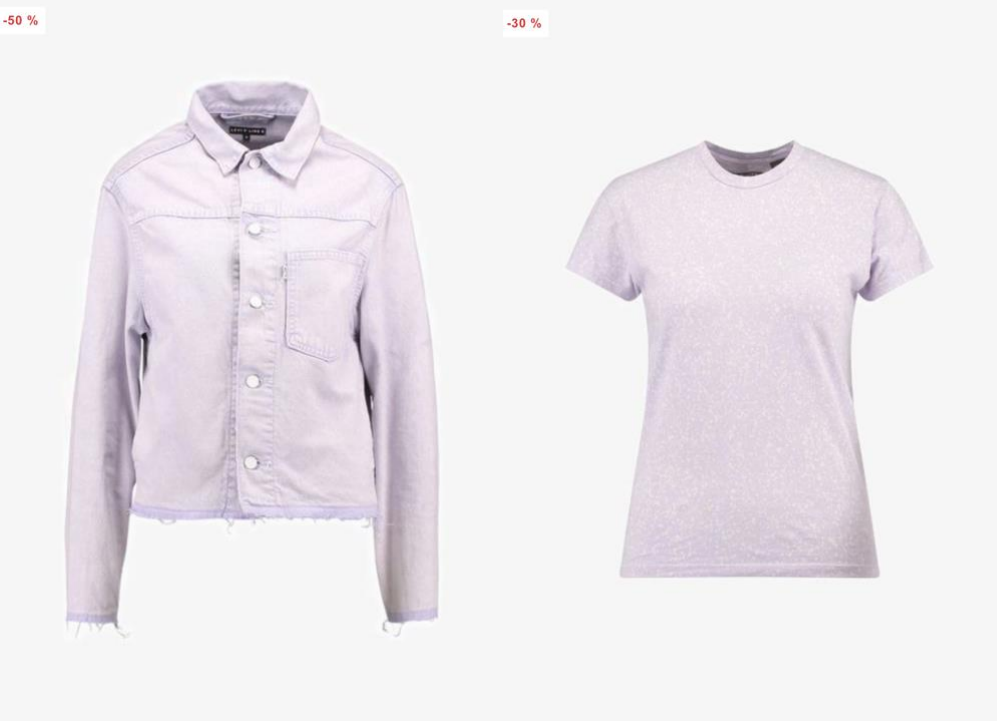
Overview of product

This presentation method shows that the product lays flat, and the intact product could be viewed. Also, there could be some drapes showing on the product. The background of the photography has a single colour, and in most situations the background is white.

https://www.net-a-porter.com/nl/en/product/1068879/Saint_Laurent/printed-cotton-jersey-t-shirt
https://www.everlane.com/products/womens-jpnese-goweave-wrap-dress-black

3D-overview of product

This presentation method shows that the clothing is worn by model but the model is invisible, and the intact product could be viewed. The background of the photography has a single colour, and in most situations the background is white.



https://www.zalando.nl/levisr-line-8-l8-unisex-decon-trkr-spijkerjas-l8-sex-ed-leh21g004-a11.html
https://www.zalando.nl/levisr-line-8-l8-tee-t-shirt-print-purple-heather-towel-wash-leh21d006-i11.html

Close view of product

This presentation method shows that the product lays flat, and the part of product could be viewed. And, there could be drape showing on the product. The background of the photography has a single colour, and in most situations the background is white.

https://www.esprit.co.uk/womenswear/clothes/jumpers-cardigans/jumpers/basic-jumper-in-organic-cotton-078CC1I002_373
https://item.jd.com/29056293496.html

Material detail (flat)

This presentation method focuses on the details of product fabric lying flat. Therefore, there is no information about the form of the product being presented.

https://shop.nordstrom.com/s/free-people-through-the-vine-maxi-dress/4975224?origin=category-personalizedsort&breadcrumb=Home%2FWhat%27s%20Now&color=ivory%20combo
https://shop.nordstrom.com/s/free-people-camo-clare-tee/4975240?origin=coordinating-4975240-0-4-PDP_2-recbot-frequently_bought_together_mega&recs_placement=PDP_2&recs_strategy=frequently_bought_together_mega&recs_source=recbot&recs_page_type=product

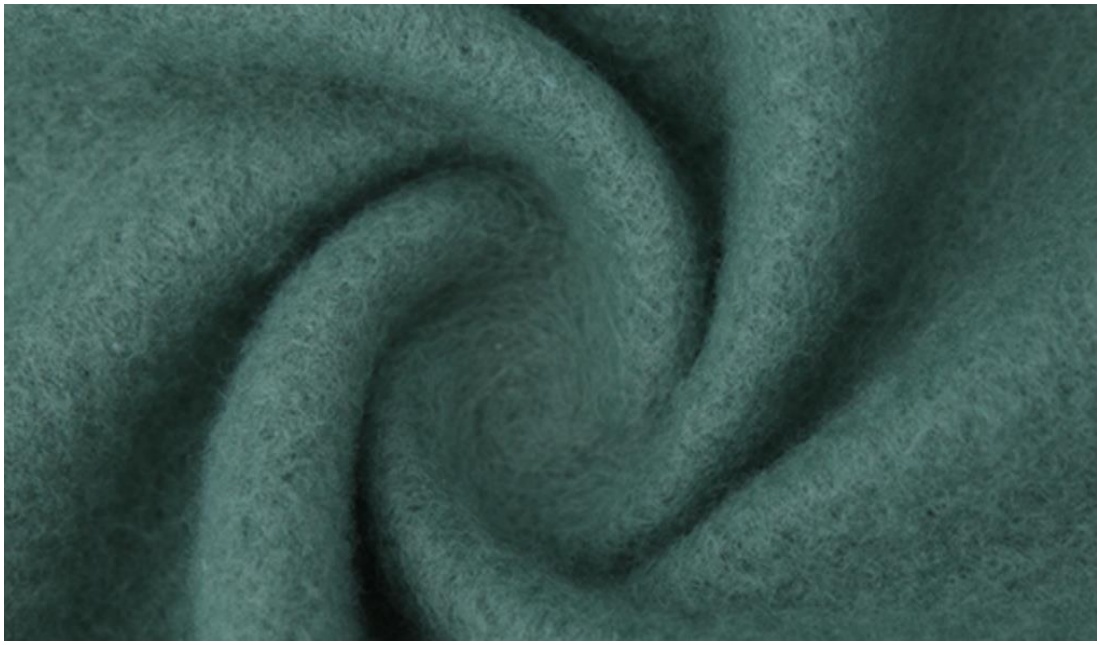
Material detail (folded)

This presentation method focuses on the details of fabric folded orderly. Therefore, no product information is presented. And, this presentation method is mainly used in Chinese online apparel shopping websites.

http://www.handu.com/goods-1062701.html
https://item.jd.com/29234074308.html

Material detail (scrunched)

This presentation method focuses on the details of fabric scrunched. Therefore, no product information is presented. And, this presentation method is mainly used in Chinese online apparel shopping websites.



http://www.handu.com/goods-1065219.html

Video

Video of a model wearing product and doing some actions

The video is recorded with the professional model wearing with the product and doing some actions to present the interactions between the product and the model body with nature movements and actions.

http://www.asos.com/daisy-street/daisy-street-cigarette-trousers-in-prince-of-wales-check/prd/9311610?clr=grey&SearchQuery=&cid=13504&gridcolumn=3&gridrow=2&gridsize=4&pge=1&pgesize=72&totalstyles=667
https://www.everlane.com/products/womens-cotton-popover-midi-shirtdress-yellow-white

Textual information

Product description

This textual presentation method describes basic information of the product features, which could be related to the product material.

A more feminine shirt dress. This collarless silhouette belts at the waist, and is made of lightweight pinpoint Oxford cloth that's ideal for warm weather wear. Did we mention it has pockets?
https://www.everlane.com/products/womens-cotton-collarless-belted-shirt-dress-red-white?collection=womens-newest-arrivals

Fabric constitution

This textual presentation method describes the proportion of the product material and the material code.

COMPOSITION Viscose 100% Lining: Viscose 100% **ART. NO.** 0678417003

http://www2.hm.com/en_gb/productpage.0678417003.html

Fabric information

This textual presentation method describes the information of material features.

- Lightweight, very comfortable fabric with a fashionable minimalist print

https://www.esprit.co.uk/women-swimwear/light-printed-dress-with-openwork-details-018EF1A118_400
https://www.zara.com/nl/en/

Care information

This textual presentation method describes the caring cautions of the product maintenance or cleaning , which are related with the product material. Some websites only use textual information, but some websites also provide icons that represent certain care information.

- Care tip: ironing brings this item with a percentage of viscose back to its original shape and length after being washed.

https://www.esprit.co.uk/womenswear/clothes/jumpers-cardigans/jumpers/basic-jumper-in-organic-cotton-078CC1I002_373

Scale references of fabric attributes

This textual presentation method directly describes the level of the certain feature of the product, providing consumers suggestions of feature index, such as thickness, stretchability. Different types of the product might have different scale references. And, this presentation method is mainly used in Chinese online apparel shopping websites.

https://detail.tmall.com/item.htm?spm=a312a.7700824.w5003-17868008298.5.3932da71C1t0SN&id=567045677860&rn=1c8417f5083fda7d53e6c5dc58af55a8&abbucket=2&scene=taobao_shop