

DEVELOPMENT OF THE GARMENT BRAND GAIA & DUBOS:
TARGET AUDIENCE AND BEST ENVIRONMENTAL AND ETHICAL PRACTICE

by
Léonie Daignault-Leclerc
Fashion Design Collegial Diploma, Campus Notre-Dame-de-Foy
Fashion Design and Management, Université du Québec à Montréal
Toronto, May 9th 2015

A MRP
presented to Ryerson University

in partial fulfillment of the requirements for the degree of
Master of Arts
in the Program of
Fashion

Toronto, Ontario, Canada, 2016
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DEVELOPMENT OF THE GARMENT BRAND GAIA & DUBOS: TARGET AUDIENCE AND BEST ENVIRONMENTAL AND ETHICAL PRACTICE

Léonie Daignault-Leclerc

Master of Arts, Fashion, Ryerson University, 2016

Abstract

This research essay examines the target audience's profile and preferences for the development of the garment brand Gaia & Dubos, which creates and produces ecological and ethical high-end garments for women in the province of Quebec, and explores the best environmental and ethical practice to establish a sustainable fashion enterprise. The research methods for this project combine a literature review, an online survey and four individual interviews with the target audience in an attempt to answer the research questions: (1) Who is the target audience (demographics, values, lifestyle and habits)? (2) What are the target audience's preferences when it comes to ecological and ethical clothing? (3) What is the best environmental and ethical practice for a clothing brand?

Keywords: ecological and ethical garments, best environmental and ethical practice, sustainable fashion brand, Quebec women, Gaia & Dubos.

Acknowledgements

I would like to express my gratitude to my research supervisor, Dr. Alison Matthews David, for her immense support, creative ideas and critical review of my work. I would also like to offer my special thanks to my second reader, Dr. Lu Ann Lafrenz, for her help and profound knowledge of sustainability issues and solutions, and to Dr. Ben Barry for his support during the developmental stage of this research. A special thanks to all the survey respondents and interview participants for their time and devotion, without whom this research could not have existed. I would also like to thank everybody who actively helped me in the development of the brand Gaia & Dubos: Adam Abouaccar, Maxime Boivin, Delphine Daignault-Leclerc, Catherine Dionne, Amélie Laforest-Abraham, Jozef Lambrecht, Isabelle Martin Feliu, Jean-Samuel Morais, Dimitri Néron, Karolina Pran, Jérémi Roy and Perrine Vin. Finally, I wish to express my sincere thanks to my husband, friends and family who helped me closely or remotely to develop the brand and achieve my dreams.

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DEVELOPMENT OF THE GARMENT BRAND GAIA & DUBOS

Development of the Garment Brand Gaia & Dubos:

Target Audience and Best Environmental and Ethical Practice

Introduction

Background and Purpose

This research essay examines the target audience's profile and preferences for the development of a brand of ecological and ethical high-end garments for women in the province of Quebec, and explores the best environmental and ethical practice to establish a sustainable fashion business. The garment brand that is being developed through this research project, Gaia & Dubos, is already functioning as an information resource. The researcher, who is the designer and founder of Gaia & Dubos, regularly publishes articles and videos about various issues inherent to the fashion industry and its environmental and ethical principles. The brand also offers online mending classes to help consumers develop their autonomy and keep their clothes longer. She now wants to expand the brand by creating and producing garments for a given target audience, which was determined by this current study. By establishing the target audience's profile and preferences, the researcher was able to better understand the customers in order to create a brand image accordingly. Since the enterprise proclaims itself sustainable, it is important that it employs the best environmental and ethical practice, which is being explored in this essay through a thorough review of the literature.

Methods

The research methods for this project combine a literature review, an online survey and four individual interviews in an attempt to answer the research questions: (1) Who is the target audience (demographics, values, lifestyle and habits)? (2) What are the target audience's

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preferences when it comes to ecological and ethical clothing? (3) What is the best environmental and ethical practice for a clothing brand?

In the first place, an online survey was conducted in order to establish the target audience's profile. The researcher collected 316 responses from female participants aged 18 and older living in the province of Quebec, and 224 valid questionnaires were analysed. Women were selected as the primary target audience based on the researcher's garment design preferences. In addition, past research shows that women tend to be more ecologically and ethically conscious than men (McIntyre, Meloche & Lewis, 1993; Banerjee and McKeage, 1994; Umberson, 2008; Niinimäki & Hassi, 2011) and are generally more involved in fashion (Tigert, King & Ring, 1980; Browne & Kaldenberg, 1997; Auty & Elliott, 1998), making them a viable market segment for the brand Gaia & Dubos. The province of Quebec was selected as a primary geographical area based on the researcher's background and sense of belonging, but also because it represents a market with high potential for the development of an ecological and ethical garment brand for women (Enviroscope, 2012). The online survey results show that the age bracket showing the most interest in ecological and ethical high-end garments were women aged between 35 and 55.

In addition to the online survey, individual interviews were conducted with four participants pertaining to the target audience. Women aged 35 to 55 living in Quebec were recruited to participate in a 30-minute in-person interview with the researcher. In order to participate, the interviewees had to be interested in at least one of the followings: (1) Their physical appearance in general; (2) Ecological garments (garments that have a minimal environmental impact); and (3) Ethical garments (garments that respect high ethical/fair trade standards), in order to ensure they were potential customers. Four women, respectively aged 39, 49, 49 and 52 years old, participated in an individual interview with the researcher. They were

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asked to bring a garment that they have owned for at least two years in order to verify what makes them develop a long-lasting emotional connection to their clothes. Moreover, the garment the participants were asked to bring had to be one that they love and still wear today, in an attempt to ensure the emotional attachment is deep and still valid, so they could speak about their current preferences (see Appendix A to see photographs and descriptions of the participants' garments).

Lastly, a thorough review of the existing literature was conducted to determine the best environmental and ecological practice for a garment brand. Various sources from a range of researchers were synthesized to determine which methods have the least environmental and social impact when it comes to the creation and production of a garment collection. Thus, the analysis was divided into categories, comprising Design Strategies, Sourcing Strategies, Production, Distribution and Packaging Strategies, Use, Care and Disposal and Information and Branding.

Viability of the Project

Consumers are becoming increasingly aware of the social and environmental impacts of their purchasing decisions, particularly when it comes to fashion consumption (Allwood, Laursen, Malvido de Rodriguez & Bocken, 2006; Chen & Burns 2006; Carrigan & de Pelsmacker, 2009; Kozlowski, Bardecki & Searcy, 2012; Shen, Wang, Lo & Shum, 2012; Godart & Seong, 2015). Indeed, people are increasingly looking for ecological and ethical apparel, which represents a growing market (Shaw & Tomolillo, 2004; Alexander, 2005; Fraj & Martinez, 2006; Thomas, 2008; Cervellon & Carey, 2011).

Past research suggests that environmental knowledge is associated with the adoption of eco-conscious attitudes and behaviours (Ellen, Wiener & Cobb-Walgren, 1991; Kim &

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Damhorst, 1998; Chan, 2001; Lee, 2011; Tan, 2011), while Umberson (2008) directly links environmental concerns with eco-friendly apparel purchase. In the online survey conducted as part of this research, 64.4% of the respondents strongly agree or agree that they are concerned with the environment and that they take actions to protect it, and 40.5% strongly agree or agree with the fact that their knowledge on environmental issues is high. Therefore, it can be speculated that these respondents are potentially likely to buy ecological and ethical garments.

It has also been shown that when consumers believe their consumption habits have an impact on the environment, they tend to adopt eco-conscious consumption behaviours (Kang, Liu & Kim, 2013). Past research also suggests that consumers' personal perceived environmental impact can predict environmental consumption behaviour (Berger & Corbin, 1992; Do Paco & Raposo, 2010). In the online survey, 63.4% of the respondents strongly agree or agree they believe that each action they take to protect the environment has a positive impact on it. Furthermore, past research indicates that engagement in ecological and ethical apparel purchase increases among consumers who understand how clothing affects the environment (Hustvedt & Dickson, 2009; Stephens, 1985). The results of the online survey show that 67.6% of the participants strongly agree or agree that the fashion industry has a significant environmental impact, showing that an engagement with ecological and ethical garments is more likely to occur among these respondents.

Some scholars also suggest that if consumers have bought environmentally friendly products in the past, they are more likely to do it again (Abdul-Muhmin, 2007; Cowan & Kinley, 2014). In the online survey, 75.2% of the respondents affirm that they have already bought ecological and/or ethical products before, regardless of category. Therefore, it can be speculated that they are likely to do it again. Even though only 5% of the respondents strongly agree or agree

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with the fact that they always buy ecological or ethical garments, 46.8% affirm that they would like to buy ecological and ethical garments within the next year, and 64.9% strongly agree or agree that they would like an ecological and ethical garment brand or boutique to open in their city.

Moreover, it can be assumed that fashion consumption often reflects consumers' identity and values, since clothing represents the social image of individuals (Davis, 1994). The survey indicates that 69% of the respondents would be proud to wear ecological and ethical garments, and 35.4% say ecological and ethical garments correspond to who they are and their values. Therefore, launching a brand of ecological and ethical garments for women in the province of Quebec seems to be a highly viable project in terms of consumers' interest and willingness to buy. However, it is important for a brand to understand its customers' profile and preferences in order to target them efficiently. It is also highly relevant for an enterprise that claims to be sustainable to employ proper environmental and ethical practices. This is what this research examines and brings together, in an attempt to build a strong and successful clothing brand.

PART I: GAIA & DUBOS'S TARGET AUDIENCE

Target Audience's Profile

Demographics

In past research, the typical socially conscious person has been portrayed as female, pre-middle aged (30 to 50 years old), with a high level of education and a high income (Anderson & Cunningham, 1972; Schwart & Miller, 1991; Chan, 1999; Laroche, Bergeron & Barbaro-Forleo, 2001; Niinimäki, 2009). Age is the primary demographic information chosen to select the target audience for the brand Gaia & Dubos. Indeed, the results of the online survey indicate that age has great influence on the respondents' values, lifestyles, habits, and preferences.

Age¹. The analysis of the online survey shows that the age group that is most likely to buy garments offered by Gaia & Dubos is the 40 to 49 year-old-bracket (see Appendix B for more information about age and interests). However, the results show that among all survey respondents, only 7.89% (12) pertaining to the 40-49-year-old age group answered the online survey. Therefore, for practical reasons, the target audience's age was expanded to 35 to 55 years old in order to allow flexibility regarding targeting strategies and in an attempt to reach a wider audience. Nonetheless, the age bracket of 40-49 years old is being analysed in the research, as a result of the initial online survey design.

The results indicate that 83.33% of the respondents aged between 40 and 49 strongly agree or agree with the fact that they care about the environment and take actions to protect it, which represents the highest percentage across all age brackets. The survey also shows that 66.67% of these respondents strongly agree or agree that each small gesture they make to protect the environment has a positive influence on it and think the fashion industry has a considerable

¹ Respondents aged of 70 years and older were not taken into account for the determination of the target audience's age group, as only 4 respondents corresponding to that age bracket answered the survey (1,4% of all respondents).

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environmental impact. Furthermore, 66.67% of these respondents strongly agree or agree that their knowledge of environmental issues is high, which represents the highest percentage across all age brackets. It can therefore be assumed that women of this age bracket are more likely to buy ecological and ethical garments, as discussed above.

Quebec women aged of 40 to 49 seem to represent a high-potential market for Gaia & Dubos. Indeed, 8.33% of the respondents pertaining to this age group strongly agree or agree with the fact that they always buy ecological and/or ethical garments, and 75% say they would be proud to wear ecological and/or ethical garments, which are again the highest percentages across all respondents. Moreover, 58.33% strongly agree or agree that ecological and/or ethical garments correspond to who they are and their values, and 75% affirm they would like to buy ecological and/or ethical garments within the next year, again representing the highest percentages.

A majority (72.72%) of them say they have already bought ecological and/or ethical products, regardless of category. This can lead to the assumption that those who have already bought these kinds of products will do it again, as shown by Abdul-Muhmin (2007) and Cowan and Kinley (2014). Furthermore, the respondents corresponding to the target audience's age group are the most interested in having an ecological and ethical garment brand or boutique open in their city (66.67%).

Urban area. Among the respondents aged of 40 to 49, 58.33% live in Quebec City, 25% in other urban areas and 16.67% in Montreal (see Appendices C1 and C2 for a close examination of neighbourhoods). Only 16.66% of all the respondents of this age group say they prefer to live downtown rather than in the countryside or in the suburbs. The ideal geographical location for a

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Gaia & Dubos store would therefore be in Quebec City and ideally not be located downtown. Furthermore, the brand should offer online purchases to facilitate accessibility regardless of area.

Level of education and main occupation. The most recurrent level of education among 40 to 49 year olds is undergraduate degree (50%) (see Appendix C3 for close examination of levels of education). In terms of main occupation, 91.67% of them affirm they are full-time salaried employees and 8.33% part-time salaried employees. This means that the target audience is predominantly working, which suggests that they have a stable income that might allow them to invest in sustainable high-end garments. Furthermore, the target audience's employment situation should influence garment design and professional outfits should be included into Gaia & Dubos's collections.

Income. The most recurrent level of annual family income (in Canadian dollar) among 40 to 49 year olds is \$100 000-\$139 000 (33.33%) (see Appendix C4 for close examination of income). This suggests that the target audience has the financial means to buy ecological and ethical high-end garments, as it is estimated that a middle-class income is between \$47 150 and \$94 304 for Quebec families with two children, and between \$23 575 and \$47 152 for people living alone (ICI Radio-Canada, 2014). This age bracket therefore represents a viable market segment for Gaia & Dubos since it creates high-end garments with ecological and ethical credentials that might cause the retail prices to increase.

Social status and dependent children. Laroche et al. (2001) found that individuals who are married and have children living at home are more likely to be willing to pay more for ecological products. Among the respondents aged of 40-49, 66.67% live in common-law union, 25% are married and 8.33% are divorced. Moreover, 91.67% of them have children (see Appendix C5 for close examination of number of dependant children). Again, this suggests that

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this age group might be more likely to buy Gaia & Dubos products. Furthermore, the brand could facilitate shopping for mothers with dependant children, by offering online purchases or dedicating a space for kids in the boutique.

Language and ethnicity. It can be speculated that the main language used by the target audience is French, since 100% of the respondents aged between 40 and 49 chose to complete the French version of the survey (as opposed to English). Among the target audience, 91.67% affirm they are Caucasian and only 8.33% Latino-American or Hispanic. Gaia & Dubos design and marketing strategies could therefore mainly target Caucasian women. However, as the brand encourages diversity, design and marketing efforts will include various body types and ethnicities despite the ethnic background apparent in the online survey.

Values, Lifestyle, Habits and Behaviour

Values. Laroche et al. (2001) identify three primary consumer groups who are most likely to buy ecological products: health-conscious, environmentalist and quality-hunter consumers. In the online survey, 83.33% of the respondents aged of 40 to 49 strongly agree or agree that health is a priority for them. As mentioned earlier, 83.33% of these respondents strongly agree or agree with the fact that they care about the environment and take actions to protect it, and 41.67% say they prioritize quality and durability when they buy garments. This age group reflects the three consumer groups defined by Laroche et al., therefore indicating that they represent a high-potential market for Gaia & Dubos.

Fraj and Martinez (2006) found in their study that consumers who experience feelings of self-fulfillment (e.g.: accomplishment, gratitude, sense of success) are those who are the most aware of environmental problems and who adopt an ecological lifestyle. In the online survey, 83.33% of the respondents aged of 40 to 49 consider themselves fulfilled, happy, altruists and

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attentive to others, and 25% describe themselves as spiritual individuals. Respondents of this age bracket are also characterized as enjoying quality time with friends and family (100%) and in nature (91.67%). Career does not seem to be a priority for them (33.33%), with only a minority requiring chic and elegant clothes for work (25%). Altogether, these values might indicate a higher interest in buying ecological and ethical garments. Nonetheless, Gaia & Dubos should offer some professional outfits to respond to the customers who require chic or elegant clothes, in addition to the fact that the majority (91.67%) of them work full time.

According to Wiener and Sukhdial (1990), individuals may have ecological concerns but feel that the protection of the environment is the responsibility of governments and corporations, leading to a lack of actions undertaken to protect the planet. Among the respondents aged of 40 to 49, 25% strongly disagree or disagree with this disavowal of individual responsibility for the environmental crisis. This may indicate that they take responsibility for the preservation of the planet and therefore may be more likely to engage with sustainable consumption behaviours.

Lifestyle. In the survey, 50% of the respondents aged between 40 and 49 affirm the car is their main mode of transportation, whereas 26.92% say they mainly use active transportation, and only 18.18% mainly use public or shared transit to get around. Gaia & Dubos store could therefore offer access to parking spots to respond to the target audience's needs. However, respondents who mainly use the car seem to send a contradictory message with their environmental concerns and values. Indeed, cars are without a doubt more polluting than public or shared transit and active transportation. Thus, Gaia & Dubos could also try to encourage consumers to take the public transit (by being close to a bus stop, for example) and to use active transportation (by offering bike racks and a water fountain, for instance).

In terms of time allotted to help protect the planet, 50% of the respondents pertaining to

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the target audience strongly disagree or disagree that they are too busy to actively take part in the protection of the environment, which suggests that they might have time to engage with environmental activities.

Habits and behaviour. Only 25% of the respondents aged 40 to 49 strongly agree or agree that they follow fashion trends, which represents a positive aspect for Gaia & Dubos as the brand creates classic garments. Moreover, 36.36% of these respondents believe they have the financial means to buy ecological and/or ethical garments. All interview participants affirm they have already bought garments that are locally made and/or that present environmental or ethical credentials, which suggests they might do it again in the future (Abdul-Muhmin, 2007; Cowan & Kinley, 2014).

However, none (0%) of them say they consider paying more for their clothes than most people around them, which might represent an issue for an ecological and ethical high-end garment brand like Gaia & Dubos. Only 33.33% of them indicate they like to spend time shopping for garments, whereas interview participants 1 and 2 indicate they do not like to spend a lot of time shopping. This could imply that ease and accessibility of shopping could encourage them to buy Gaia & Dubos garments. Developing an easily accessible store and an online boutique could therefore be potential solutions. Furthermore, offering other types of sustainable products (i.e.: cosmetic, home care products, decoration, etc.) in the store could facilitate shopping by creating a one-stop-shop.

All interview participants affirm they are not compulsive buyers, but are able to buy a garment on a whim when it is love at first sight. Participants 1 and 2 affirm they put more thought when buying a high-quality, original or expensive garment because of the consequences it can imply. Participant 2 explains that when she buys a garment, she always asks herself whether she

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will still like it in a few years and whether she owns anything to wear it with. Perceived risk can be lowered by Gaia & Dubos by giving ample information about the garments in regards to quality, durability, design, and ecological and ethical credentials. Furthermore, by offering garments that are slightly original but still classic, consumers could perceive less risk attached to emotional durability or concerns linked to mix and match with other clothes they own.

Research has shown that social pressure can lead to modified behaviour. Indeed, Umberson (2008) explains that, “as society exerts social pressure on an individual to act more environmentally responsible, the more likely that person is to purchase apparel that is environmentally friendly” (p. 11). In the online survey, only 8.33% of the respondents pertaining to the target audience’s age group strongly agree or agree that people around them think they should buy ecological and/or ethical garments. The brand will need to deploy marketing strategies in order to compensate for this lack of social pressure.

The survey shows that 41.67% of the target audience strongly agrees or agrees that they always follow the care instructions indicated on the label of their garments and always look at the country of fabrication of the clothes they buy. A great majority (75%) strongly agree or agree that when they truly love a garment, they take care of it (delicate care, adequate storage, limited wearing, etc.). These behaviours represent the target audience sought by Gaia & Dubos, as the ideal customer cares about the fact that the garments they buy are made ethically and locally, and takes care of their garments so that they can last longer.

Niinimäki (2013a) explains that when focusing on sustainable use of clothing, consumers should concentrate on “extending garments’ owning time and using them more frequently” (p. 23). In the online survey, 100% of the respondents corresponding to the target audience’s age group affirm they usually wear their garments for several years. In the individual interviews,

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participants 2 and 4 mention they usually keep their clothes for an extended period of time or buy them second-hand to reduce the need for production of new garments. All of them have owned the garment selected for the interview for at least 3 years, participant 2 having owned it for 25 years. She explains she is incapable of getting rid of it because of her emotional attachment, despite the signs of wear and tear it shows. Therefore, Gaia & Dubos should develop high-quality and durable garments that have classic styles in an attempt to trigger long-lasting use, while incorporating original details in order to create a deep emotional attachment.

Furthermore, 33.33% of the target audience indicate they buy garments multiple times per year, and as few as 8.33% of them say the main reason they dispose of their clothes is because they are sick of wearing them. In addition, only 16.67% strongly agree or agree that they usually get rid of their clothes because of their poor quality or bad fit. These factors might indicate that the target audience normally buys high-quality, well-fitting garments they truly love. Therefore, these traits represent Gaia & Dubos's ideal customer, as the garments offered by the brand are classic, high quality and durable. Furthermore, none (0%) of them say they put their garments in the trash when they do not want them anymore or when they are in bad condition. Rather, 100% of them affirm they give their garments to charities or to people they know when they do not want them anymore, and 58.33% of them strongly agree or agree that they mend, reuse or transform their garments when they are in bad condition. These behaviours seem to reflect a high concern for the environment.

Target Audience's Preferences

Materials

Composition. In the online survey, 58.33% of the respondents aged between 40 and 49 strongly agree or agree that they prefer natural materials rather than synthetic materials. They are also the age group that is most interested in buying garments made of synthetic materials, however only if they are made of recycled fibres (50%). Even if only 8.33% of these respondents indicate they regularly wear second-hand garments, 45.45% of them strongly agree or agree that they are interested in buying ecological and ethical garments that comprise recycled or second-hand materials or components.

The results of the individual interviews show that all participants prefer natural fibres over synthetic materials. In point of fact, participants 1 and 4 affirm they like them better because they are more comfortable, while participants 2 and 3 perceive natural fibres as better for the environment. However, even if she prefers natural fibres, participant 2 thinks they are harder to care for than synthetic materials and does not differentiate between both types of fibres when it comes to comfort, as long as the fabric is not itchy or makes her sweat. Participant 1 also claims that wool, even though it is a natural fibre, is usually too itchy. Participant 3 affirms she has no knowledge on the environmental impact of dyes because no information is provided to the consumers. Finally, participant 4 affirms that she would love to buy garments that include recycled components or fibres. It can therefore be assumed that the target audience prefers natural fibres, either for comfort or environmental concerns. Furthermore, garments offered by Gaia & Dubos should by no means be itchy, and the brand should create garments made of recycled components and provide information about the dyes contained in its products.

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Aspect. Participants 1, 2 and 4 affirm they like comfortable, supple and soft materials. Participants 1 and 2 also say it is important to them that the fabric does not pill or deteriorate over time, and participants 1 and 3 claim they favour high-quality fabrics when they buy garments. Participant 3 does not like really thick materials because they can get too warm, especially during the summer, while she recognizes that thick fabrics help refine the silhouette. Lastly, participants 2 and 4 say they like garments that have a tactile or visual texture, either in the way it is woven or knitted or in the colours or shimmers of the fabric. Thus, Gaia & Dubos should include in its collections comfortable and high-quality materials. It may also consider incorporating fabrics that are not too thick, while heavy enough to refine the silhouette, and fabrics that present interesting tactile or visual textures.

Design

Quality, durability and classic designs. Niinimäki (2013a) explains, “when focusing on ethical and sustainable use and consumption” (p. 22), consumers should prioritize durability, quality and classic styles when buying fashion products. As mentioned above, the results of the survey indicate that 41.67% of the target audience favour quality and durability. Moreover, 50% of the respondents strongly agree or agree that they favour classic designs, 41.67% indicate they pay great attention to details, and 75% indicate they always prioritize comfort.

In the individual interviews, participants 1, 2 and 3 indicate they prioritize quality and/or durability when shopping for garments. Moreover, participants 1, 2 and 3 affirm they prefer to buy classic or simple designs in order to keep their garments longer. However, these criteria are not prioritized for the same reasons. Participant 1 favours classic designs because she does not like to go shopping often, while participant 2 buys timeless garments out of environmental

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concern, and participant 3 likes simple designs because she believes they are easier to accessorize and mix and match with other garments. Participant 4 claims she likes to be a bit trendy.

Original details are important criteria for participants 1, 2 and 3, prioritizing one-of-a-kind details such as trimmings, pleating, pockets, collars, transparency, texture, and colour. Lastly, comfort also seems important to the target audience: all participants affirm they prioritize comfortable garments. In point of fact, the garments they brought to the interview were all knitted, which might suggest they love them mostly because of their stretchiness, ease of movement and overall comfort. Furthermore, knitted garments may allow variation in body size, which is an important part of sustainable design (see Design Strategies section to learn more about adjustability). The results show that comfort can cause sentiments of confidence, appropriateness, ease of movement, pleasure, and cosiness among the target audience.

Gaia & Dubos should always prioritize quality and durability when creating its collections, both to respond to the target audience's preferences and to maximize the environmental benefits of the products. Lastly, the brand should offer classic and simple designs, and allow meticulous attention to original details and comfort.

Cut and fit. The analysis of the four individual interviews suggests that the target audience prioritizes cut and fit when buying garments. Indeed, participants 1, 2 and 3 indicate that these criteria are important to them, while participant 4 says they do not really have an impact on her purchase decisions, unless the fit is ostentatiously deficient. Appropriateness was also widely discussed in the interviews. In fact, all participants affirm it is important to them to buy garments that are either appropriate to their age, body type, or work environment. Notions of cut, fit, transparency, length, depth of necklines and/or physical condition of the garments are important to them and that they link to appropriateness. Lastly, all participants believe it is

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important to feel beautiful in the garments they wear. Indeed, they say that fit, cut and colour are factors that have the power to make them feel beautiful. Participant 2 and 3 affirm that receiving compliments on their outfit or feeling like the centre of attention can trigger sentiments of confidence. In the creation of its collections, Gaia & Dubos should insist on the quality of cut and fit while focussing on appropriateness and confidence triggers, based on the aforementioned criteria.

Specific questions related to cut, silhouette and colours were also asked to the participants, both in the online survey and the individual interviews. The results were visually represented in graphs and will orientate the designs for future collections (see Appendices D1 and D2 for more information about design preferences).

Transformable garments. Transformable garments (modular, adjustable or reversible) normally increase wear rate and have the potential to postpone disposal, as the life cycle is expanded by repeated transformations (Koo, Dunne & Bye, 2014). Koo et al. (2014) state, “The expected result is garments with more chances of being worn and used for a longer time, extending the clothing life cycle” (p. 11). Transformability being part of Gaia & Dubos’s agenda for garment creation, survey respondents were asked about their intentions to purchase such products. Among the target audience, 54.54% affirm they are interested in buying ecological and ethical garments that are modular or reversible, 41.67% indicate they are interested in buying ecological and ethical garments that are adjustable, and 45.45% affirm they are interested in buying ecological and ethical garments that offer customization options such as choice of shape of certain details, or choice of material and pattern. A study conducted by Koo, Dunne and Bye (2014) shows that consumers are willing to pay up to three times more for transformable garments than regular garments. Gaia & Dubos should therefore offer transformable garments

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and propose some kind of customization options. Transformable garments will be further discussed in the Design Strategies section.

Visual differences. The online survey shows that 33.33% of the 40-49 year olds strongly disagree or disagree that they would buy ecological and/or ethical garments only if there were no visual difference compared with regular garments, which suggests they might be interested in buying ecological and ethical garments that do offer visual differences. Thus, Gaia & Dubos should focus on creating garments that have some kind of visual differences compared with non-ecological and ethical clothes. This could be achieved by observing the competitors' collections and incorporating some variations.

Production

Local. The context of production seems to affect purchase decisions among the target audience. In point of fact, Kang and Kim (2013) explain that country of origin has the power to signal quality. Thus, consumers might use this information when they evaluate the quality of the garments they buy. The analysis of the interviews shows that all participants prefer to buy garments that were produced locally, more specifically in the province of Quebec. They affirm they are ready to pay more for products made locally, and explain it is a plus when buying a garment. However, participant 2 affirms she does not want to pay extremely high prices only because the product was made in Quebec. In order to pay a premium for a locally made product, she also wants it to be high quality and/or have sustainable credentials. Participant 4 claims she is confused when a garment label says "made in Canada", because she perceives that some brands only produce a small percentage of their products onshore but still announce them as locally made.

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Participants 2 and 4 affirm that they always look at the country of origin when shopping for clothes. Participant 3, who frequently shops at Simons, a leading clothing store in Quebec, says she is disappointed to see garments made in developing countries. Gaia & Dubos will with no doubt produce ethically in the province of Quebec, and should focus on clearly labelling its garments “100% made in Quebec, Canada”, in order to reduce perceived risk and to increase the sense of belonging of Quebecers. Furthermore, the origin of the materials could be written on the labels to be completely transparent and let the consumers know exactly where the products come from.

Ethical working conditions. All participants mention they are concerned with working conditions in the fashion industry. Therefore, they all prioritize locally or ethically made garments, or choose to buy second hand to avoid directly encouraging bad working conditions. Participant 2 does not buy garments made in developing countries anymore because she does not want to take part in dishonest production practices. The brand should therefore give ample information in regard to its sourcing and production standards to efficiently communicate its environmental and humane values and practices.

Purchase

Information. Niinimäki and Hassi (2011) describe ecological and ethical garment consumers as showing interest in acquiring information about the environmental impacts as well as ethical issues in the fashion industry. In point of fact, 66.67% of the survey respondents aged of 40 to 49 strongly agree or agree with the fact that they would like to learn more about ecological and ethical garments and their benefits. Moreover, 75% of the respondents of that age group affirm they would buy ecological and ethical garments if there were more information given on their environmental and ethical credentials. Thus, information about the environmental

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and ethical benefits of the products seems to be highly important for the target audience and Gaia & Dubos should focus on efficiently communicating its practices with the consumers. The brand already educates consumers about sustainable fashion through its [blog](#)², where videos and articles are regularly published.

Moreover, 41.67% of the respondents pertaining to the target audience indicate they would buy ecological and ethical garments only if they had environmental and/or ethical certifications. Therefore, Gaia & Dubos should seek certifications to ensure potential consumers do not have concerns or doubts about the environmental and ethical credentials of the products. In the individual interviews, opinions about certifications widely differ. Participant 2 affirms she would like to see environmental and ethical certifications when buying sustainable clothing, while participant 3 feels they would make the prices increase due to their cost. She thinks that clear information about environmental and ethical credentials are sufficient to make her trust a brand's honesty.

Accessibility. In the online survey, 58.33% of the respondents aged of 40 to 49 strongly agree or agree that they would buy ecological and ethical garments if they were easier to find, which could imply that ease and accessibility of shopping could encourage them to buy Gaia & Dubos garments. During the individual interview, participant 2 mentioned that if she really likes a brand and knows it offers garments that correspond to her values, she will shop there exclusively. Gaia & Dubos should focus on positioning itself as the leader in ecological and ethical clothing in the province of Quebec, in an attempt to attract consumers who do not know where to turn to when they are looking for sustainable clothing. In point of fact, participant 1 says she usually buys her basic garments from popular fast fashion stores (i.e.: Gap, H&M, etc.) and gets her original pieces from designers. She explains that she does not see that many basic

² <https://www.gaiaetdubos.com/blogs/blogue-de-gaia-dubos>

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garments offered in designer stores, thus she prefers to go to popular stores for basics for efficiency and accessibility. However, she admits she is conscious of the ethical dilemma when shopping at popular fast fashion stores. Participant 3 also mentions she would like to see more affordable and accessible designer creations. She thinks Quebec designers' collections are often too stylish, pricy, and not suitable for everyday use. Thus, Gaia & Dubos should offer basic and affordable garments that are suited for the customers' daily lives. In addition, these pieces should be easily accessible and identifiable so the target audience knows where to shop when they are looking for basics.

Shopping. In the individual interviews, all participants indicate they do not like to encourage large corporations (i.e.: Walmart, H&M, Gap, etc.) when buying garments, and prefer to buy at local designer stores (i.e.: Kollontai, Aim Com Moi, Blank), Quebec stores (i.e.: Simons), craft shows (i.e.: Salon des métiers d'art) or community thrift stores (i.e.: Présence Famille). Participant 1 thinks it is more agreeable and meaningful to shop at local designer stores, and participant 4 says she loves the ambiance of thrift stores. Participant 3 affirms that she does not like to shop in large malls, because she thinks it is always too busy, hot, and complicated to park. Thus, Gaia & Dubos should make the purchase experience agreeable by offering high-quality customer service, for example, and ease of shopping by creating a unique and relaxed ambiance in the store. Easy access could be implemented with access to parking spots, public transit or bike racks. In addition, Gaia & Dubos's collections should be available in multiple designer stores, Quebec stores and craft shows.

Price. Price has obviously a great influence on purchasing decision. However, research shows that fashion consumers are willing to pay higher prices for ecological products, as long as quality is satisfied (Ellis, McCracken, & Skuza, 2012 ; Shen et al., 2012; Shen, Zheng, Chow &

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Chow, 2014). In the online survey, 41.67% of the respondents aged between 40 and 49 say they would pay 1-14% more for ecological and ethical garments compared with non-ecological and non-ethical garments, while 33.33% of them affirm they would pay 15-29% more (see Appendix E for more information on the prices the target audience is willing to pay).

The four interviewees also affirm they are willing to pay more for environmental, ethical, high-quality, original and/or locally made garments because they translate their values. However, participant 2 explains she would not try on a garment that she deems too expensive at first sight, while participant 4 confesses she does not look at prices anymore since she almost exclusively buys highly affordable second-hand clothes. In addition, participant 2 explains that she buys fewer garments now that she pays more to have sustainable products. She also says that she wants to pay the honest price for a locally made garment, as mentioned above.

The price range for Gaia & Dubos's products should be around 1-29% more than non-ecological and non-ethical products in order to generate sales. The brand needs to scrutinize its competitors' price range in order to determine its product prices. Furthermore, it has to clearly identify the products' environmental, ethical, local, and quality credentials in order to gain trust from consumers.

Touch and trying on. The results of the interviews indicate that the target audience may have a tendency to touch the garments when shopping. In fact, participants 2 and 3 mention they always touch the fabric of the garments before they even try them on. Furthermore, participants 1, 2 and 3 think it is important to try on the clothes before they buy them, while participant 4 almost never tries them on. This could be linked to the importance given to fit. Indeed, as mentioned above, participant 4 does not really care about how the garment fits. Gaia & Dubos should place emphasis on accessibility of shopping to allow the consumers to touch and try on

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the products. The need to touch and try on the garments might represent a barrier for online purchases. Thus, the brand could offer free catalogues with fabric swatches that would be delivered to the customers' home upon order so they can see and touch the materials before buying online.

Online purchase. In the online survey, only 8,33% of the respondents aged of 40 to 49 strongly agree or agree with the fact that they have already bought garments on the Internet. The results of the individual interviews also indicate that online purchase might be an issue for the target audience. Indeed, even though participants 1, 2 and 3 have already bought clothes on the Internet, all participants believe it is highly important to try on and/or touch a garment before buying it. Participants 1, 2 and 3 say they would be willing to buy clothes on the Internet if they had the opportunity to try it on physically before or to familiarize themselves with the brand. Thus, most participants seem to be reticent to buy clothes online because they are afraid they will not fit. Indeed, participants 2 and 3 recall having ordered garments on the Internet and realized the size was not right when they received it. They also say they are usually confused with the size charts and do not know how to properly take measurements on their body. They affirm they would like to see clear photographs of the garment and be able to zoom and see all the way around it, in addition to have access to a flat drawing of the garment with clear indications on how to take measurements on their body. Thus, since Gaia & Dubos is a new brand, it needs to decrease perceived risk attached to fit when consumers are buying online. By providing detailed size charts and clear indications on how to take one's measurements, or even by offering a 3D body scan of the customers, as suggested by participant 1, the target audience could feel reassured in regard to fit. However, current technology does not allow customers to touch and try on the garment online. Given the target audience's reticence to buy on the Internet, Gaia &

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Dubos should also offer physical access to its collections, either in its own store or studio, or in designer stores.

Participants 2 and 3 say they usually get familiar with a collection online before they go shopping physically. However, the target audience also seems to be reticent to buy online because of time-related issues. Indeed, participant 2 admits that when she buys new clothes, she likes to have them in hand right away and does not like to wait for her purchase to be delivered. Furthermore, participant 1 explains that time saved by buying online rather than in store is lost if it has to be returned. In point of fact, fear of complications due to return and exchange seems to be a major issue when buying clothes online. Participant 2 firmly perceives online returns and exchanges as a burden. She thinks that the steps to return or exchange a product bought online are too complicated, even if the brand makes it free and as easy as possible for the customers. Participant 3 also thinks online purchases are risky because of returns and exchanges, but says she is interested in having the possibility to return it at a physical store. Participants 1 and 3 admit that shipping, returns, and exchanges that are free and simple are a good incentive to buy online. Gaia & Dubos should therefore offer incentives to buy on the Internet, such as free and fast shipping, and free and simple returns and exchanges. It could even provide premium delivery services if a customer does not want to wait multiple days before she receives her order and facilitate returns and exchanges by providing ready-to-ship packages with all orders. The brand should also assure a prolonged 100% refund guarantee.

Furthermore, participant 2 explains that obtaining free shipping over a certain amount spent online encourages her to buy more, and affirms she likes when a brand does a little more than expected, like giving a free gift when an item is purchased online, for example. Finally, participant 4 says she has had a bad perception of online shopping ever since she saw a

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documentary about the multinational corporation Amazon and its unethical working conditions, and admits she prefers to buy second-hand garments, which are not easily accessible online, according to her. Thus, Gaia & Dubos should encourage purchase by offering free shipping over a certain amount spent, while offering premium customer service. Lastly, the brand should minimize risk linked to the working conditions of shipping employees by working with ethical delivery companies and by providing ample information on their ethical credentials.

Care. In the survey, 50% of the respondents aged of 40 to 49 strongly agree or agree that they would buy an ecological and ethical garment even if it is recommended to hand wash only, and 91.67% say they would buy an ecological and ethical garment even if it is recommended not to put in the dryer. However, 75% strongly disagree or disagree that they would buy an ecological and ethical garment if it is recommended to dry clean only.

The analysis of the individual interviews shows that the target audience does not have consistent patterns when it comes to garment care. In point of fact, participants 1, 3 and 4 indicate they like garments that are easy to care for. They are ready to opt for delicate cycle, a net for delicate fabrics, and/or cold water when using the washing machine, but they almost never hand wash their clothes. These three participants also use the dryer, unless the garment is delicate. In such case, they hang it to dry. Participant 1 says she irons some of her garments.

Participant 2 always follows the care instructions provided on the label of her garments. Thus, she hand washes and irons her clothes only when instructed, but never puts them in the dryer, except for jeans in order to soften them a bit once they are dried. She believes drying takes too much energy and prefers to hang or lay her garments flat to dry, depending on the fabric. She even owns a machine to remove pilling and uses it when needed. Participants 1 and 2 affirm they use ecological laundry detergents.

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In regards to dry cleaning, all interview participants say they would not buy an everyday garment that needs to be dry-cleaned. Rather, they would only dry clean special clothes, like a woollen coat or an evening dress, for example. Mending seems to be common practice among the target audience. Indeed, all participants affirm they regularly mend or have their clothes mended when needed. Participant 2 even looks at the sewing techniques of a garment before she buys it, and asks herself whether she would be able to mend it or have it mended if needed. Lastly, only participants 1 and 2 admit the price paid for a garment affects the way they care for it. Participants 3 and 4 say they take care of their clothes according to their emotional attachment only, not the amount of money spent.

The results indicate that the target audience might be ready to use more delicate options on the washing machine or to hang or lay their garments flat to dry. However, hand washing seems to be an issue for the majority of participants, so Gaia & Dubos should seek to incorporate easy-care fabrics and designs into its collections. Dry cleaning also seems to be an issue when it comes to everyday garments. Thus, only garments like woollen coats or evening dresses should require dry cleaning. Ironing should be required only for a small portion of the garments offered by Gaia & Dubos. The brand should encourage its customers to use biodegradable laundry detergents and to wash their clothes as little as possible, both to reduce their environmental footprint and to increase the lifecycle of their garments (Niinimäki, 2013a). Finally, since the majority of the target audience seems to have the habit of mending their clothes or have them mended, the brand should offer basic [mending classes](https://www.gaiaetdubos.com/pages/cours-de-reparations)³, as it currently does on its website, or include repair kits or mending services with every purchase.

³ <https://www.gaiaetdubos.com/pages/cours-de-reparations>

PART II: BEST ENVIRONMENTAL AND ETHICAL PRACTICE

Design Strategies

Planned obsolescence is at the core of fashion today: the fast fashion system is based on models of rapid production and consumption, which leads to the early disposal of products due to a loss of emotional attachment (Burns, 2010; Gwilt & Rissanen 2011; Siegle 2011). Fletcher and Grose (2012) explain that ecological sourcing and production strategies are not sufficient to solve the environmental and ethical problems of the fashion industry, because the issue of overconsumption is not addressed at its core.

Past research has estimated that design decisions carry approximately 80% of the total environmental and social impacts of a product, because it has a direct influence not only on sourcing and manufacturing processes, but also on post-production phases (Tischner & Charter, 2001; Palomo-Lovinsky & Hahn, 2014). In point of fact, the way the consumers use, care and dispose of their products can trigger tremendous environmental and social impacts (Niinimäki, 2011).

This chapter offers insights on sustainable design approaches that can trigger positive environmental and ethical impacts, and ultimately reduce consumption. The strategies recommended in this research correspond to a slow fashion approach, encompassing quality, durability, sustainability, classic designs, and emotional and functional value, among other principles, in an attempt to add value to the products and deepen emotional attachment (Black, 2008; Fletcher, 2008).

Design for Consumers

Hethorn and Ulasewicz (2008) explain that designers solely focus on consumers' past purchases and projected buying behaviours rather than prioritizing customers' opinions and

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preferences. Thus, they focus on garments' potential to be purchased rather than to be worn, leading to early disposal. A sustainable clothing brand needs to deeply understand its target audience's needs, values, and preferences in order to reduce waste due to unsold garments and create long-lasting attachment. Indeed, research shows that personalised, meaningful products have the power to trigger deep emotional attachment (Chapman, 2005; Black, 2010; Niinimäki, 2011; Niinimäki & Hassi, 2011; McGrath, 2012). The market study conducted as part of this research was therefore operated in an attempt to understand the target customers and be able to co-create with them.

Physical and Emotional Durability

According to Niinimäki and Koskinen (2011) and Aakko (2013), quality is one of the most important attributes associated with long-lasting use of garments. Indeed, physical durability of a product determines how long it can be used, directly influencing its lifecycle and therefore its environmental and social impacts. The market study conducted as part of this research also shows that Gaia & Dubos's target audience favours quality when buying garments. Physical durability can also be enhanced by ease of repair and minimal required care, but these strategies will be furthered discussed in the Design for Repair and Disassembly and Design for Low-Impact Maintenance sections.

Emotional durability also influences the environmental and social footprint of a product because it can determine how it will be used, cared for and disposed of (Niinimäki, 2011). In fact, when consumers truly love a garment, they are more likely to use it for an extended period of time, opt for delicate care methods, mend it when needed and postpone its replacement (Mugge, Schoormans & Schifferstein, 2009). In order to trigger long-lasting emotional attachment, Chapman (2005) suggests creating products that patiently deliver new discoveries for the

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customer. Changing textures or colours over time, increased softness after wash, or personalised signs of wear, for instance, could trigger longer emotional attachment. Gaia & Dubos should thus emphasize physical and emotional durability of its products to meet high sustainable standards.

Aesthetic: Classic but Unique

Lamb and Kallal (1992) define aesthetic as encompassing art elements, design principles and body-garment relationship. Aesthetics seem to be one of the most important criteria when it comes to long-term attachment (Niinimäki, 2011; Aakko, 2013). Furthermore, Niinimäki (2011) estimates that classic designs can increase the sustainable value of garments; classic garments are more likely to be used for long periods of time, since they do not directly reflect seasonal fashion trends (Wrap, 2013). Allwood et al. (2006) explain that classic styles can cause consumers to purchase fewer products with higher quality and durability, since they might not perceive them as ephemeral consumption goods. Along with sustainable considerations, the target audience seems to prefer classic design, as shown with the results of the market study. However, distinctive details, like trimmings, embroideries, textures, or colours, for instance, seem to have the power to trigger deeper emotional attachment, especially among Gaia & Dubos's audience (Wrap, 2013). Thus, the brand needs to fully respect its target audience's aesthetic preferences when designing garments while focussing on classic styles and distinctiveness.

Function

Niinimäki (2011) explains that function is directly related to emotional attachment. She describes functionality as "ease of maintenance, suitability in use and satisfying use experience" (p. 83). It can be assumed that when function of a certain garment is met, it may be used for a longer period of time, increasing its lifecycle.

It can be assumed that function needs to be fulfilled in order to respond to the consumers' needs and expectations. Comfort seems to be highly favoured among Gaia & Dubos' audience, as shown with the results of the individual interviews. Niinimäki (2011) explains that comfort can enable garment longevity, as consumers develop deeper attachment to them. Furthermore, easy-to-maintain everyday garments and professional and appropriate career wear also seem to be important for the target audience.

Incorporating multiple functions into a garment may extend its lifecycle, decrease consumers' need to buy new clothes, and reduce material and production flow (Loker, 2008; Black, 2010; Dombek-Keith & Loker, 2011). Indeed, when a garment possesses multiple functions and can be worn differently on various occasions, the owner may increase wear rate and postpone its disposal (Koo et al., 2014). Transformable garments allow both aesthetics and functionality to be converted into multiple styles and functions, increasing consumers' needs, satisfaction, and emotional attachment, and deepening consumers' relationship to sustainability (Loker, 2008; Farrer, 2011; Dombek-Keith & Loker, 2011; Karell, 2013). Versatility can be accessed through modularity, adjustability, and reversibility, among other strategies.

Modularity. Modular garments feature parts – or modules - that can be worn independently, detached or replaced, creating multiple looks and functions (Fletcher, 2008). Niinimäki (2009) also explains, “Clothes can also be designed with a modular structure so that only those parts that actually become dirty will be washed” (p. 130). Furthermore, modular garments offer easy disassembly in order to mend or replace only the parts that are worn out, or to recycle or compost the different components according to their fibre or material composition (McDonough & Braungart, 2002; Fletcher, 2008). Therefore, modular garments can offer clear environmental benefits while increasing physical and emotional durability (Karell, 2013).

Reversibility. Reversible designs offer multiple looks and functions. They contain inner surfaces that can become outer surfaces, or vice-versa, which gives them the capacity for radical change in texture, colour, pattern, and function (Koo et al., 2014).

Adjustability. Individuals may vary in size over time and might not fit in their garments due to bloating, weight gain or loss, and maternity, for instance. They might also prefer to wear their clothes in certain ways, and create more fitted or ample styles, for instance. A study on design longevity conducted by the organisation Wrap (2013) shows that clothes that facilitate size adjustment, both to allow for variations in a consumer's shape and preferences, can increase garment longevity.

Other transformable features. Other transformable features include changing fabrics or patterns after use and laundering or through the incorporation of technology, adaptable lengths and shapes, and folded or tied designs, for instance (Fletcher, 2008; Black, 2008; Bye, 2010). A multiple lifecycle approach is also a design strategy that can enhance physical and emotional durability (Finney, 2006). In fact, a garment that can be transformed or reused differently at the end of its lifecycle may postpone its disposal, reducing its environmental and social impacts.

Gaia & Dubos should offer garments that respond to the various functions sought by the target audience. Transformability seems to be a highly potential solution for long-lasting attachment. However, transformable features must be easy to understand and operate in order to be adopted by consumers (Dunne, Zhang & Terveen, 2012).

Co-Creation

A highly efficient method to create a deep and long-lasting emotional attachment is to include the consumer in the creation of the product (Chapman, 2005; Niinimäki & Hassi, 2011). McGrath (2012) explains, "Instead of the industry providing prefabricate, largely homogenous

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goods and prescribing trends for passive consumers to follow, a needs based approach engages consumers as active agents whose needs and values become central to fashion design and production” (p. 5). Furthermore, this method has the potential to decrease or even eliminate excessive inventory and unsold products (Pine, 1993). Customization and halfway products have the potential to reduce the distance between the consumer and the creation process. Because the consumer needs to invest effort into the creation or production of its product, they are more likely to positively evaluate it (Cardozo, 1965; Csikszentmihalyi & Rochberg-Halton 1981; Belk, 1988; Mugge et al., 2009).

Customization. Customizable options, such as the choice of fabric, colour, pattern, shape of certain parts, or even the co-creation of the overall design, engage the consumer in the design process, potentially deepening their emotional attachment to the product. Furthermore, the personalised product may reflect the individual’s unique identity, deepening the bond with it (Blom, 2000; Blom & Monk, 2003; Kiesler & Kiesler 2005). However, Mugge et al. (2009) estimate that mass-customization is less likely to create deep emotional attachment. They state, “For the formation of a strong emotional bond with a product, the consumer should personalise the object through an effortful process” (p. 473). However, they advise not to offer customization options that are too complex, because consumers might feel they lack the skills to accomplish the task. Thus, Gaia & Dubos should assist their customers with personalised advice or clear instructions on how to proceed.

Halfway Products. Clothing brands that offer halfway garments, which are products that are not finished, may increase the emotional bond the consumers develop with the garment because of the effort they need to invest in making it (Cardozo, 1965; Csikszentmihalyi & Rochberg-Halton 1981; Belk, 1988; Mugge et al., 2009). Dahl and Moreau (2007) explain that

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undertaking such a task may reinforce an individual's sense of identity and potentially increase the emotional attachment. Halfway products that are available as kits and designed for easy disassembly offer the consumer a valuable creative experience, while enabling them to build and repair the product if needed (Papanek, 1995). However, consumers might need to have basic sewing skills and/or equipment in order to finish a halfway garment.

Gaia & Dubos should focus on co-creating its products with the customers in an attempt to deepen emotional bonding. Customizable options and halfway garments seem to offer high potential to increase satisfaction, sense of accomplishment and personal identity.

Design for Low-Impact Maintenance

Lewis and Gertsakis (2001) estimate that in a lifecycle of a cotton t-shirt, 75-80% of its total environmental impact occurs during consumer care. Designers should therefore focus on the way the consumers need to care for their products in an attempt to reduce their environmental footprint. Designing garments that wash well in cold water and with biodegradable detergents, dry quickly without tumble drying, and do not require dry cleaning or ironing will considerably decrease their environmental impact (Allwood et al., 2006; Black, 2008; Fletcher, 2014).

Another approach that can be employed is to reduce the need for laundering. Modular garments offer the possibility to reduce the volume of laundry, allowing the customer to wash only the parts that are dirty, provided that they will wait for a full load to accumulate before doing their laundry (Fletcher, 2014). Special coatings also offer the potential to reduce the need for laundering or ironing. Coatings such as antimicrobial for odour control, anti-wrinkle and stain-blocking might reduce the overall footprint of garments because of the minimal care required. However, most coatings are known to cause human health and environmental impacts (*ENDS Report*, 2004; Zeliadt, 2010; *EcoTextile News*, 2012). The widespread of some bacteria-

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killing coatings may even result in bacteria developing resistance, creating so-called super bugs (*ENDS Report*, 2007a). Therefore, Gaia & Dubos needs to investigate further to establish whether coated garments are more environmental and ethical than non-coated garments.

Another way to design garments with low-impact maintenance is to create products never to be washed or to be discarded before laundering (Fletcher, 2014). However, the latter strategy must include garments that are “produced super efficiently, from low-impact materials, involving a non-polluting transportation system and an effective economic cycle of materials reclamation and reuse” (Fletcher, 2014, p. 107).

Design for Repair and Disassembly

In order to reduce their environmental and social impact, garments need to be easily repaired and disassembled for recycling or composting (McDonough & Braungart, 2002; Fletcher, 2008). Therefore, modular clothes offer the possibility to mend or replace parts that are worn out, and to discard them separately according to their material composition. Repair kits or spare parts could also be offered at the moment of purchase in an attempt to extend the product lifecycle (Allwood et al., 2006). Since Gaia & Dubos’s target audience is fond of trimmings and special details, as mentioned above, customers could be provided with spare decorative elements to replace them easily.

Technologies

Designing clothes that include certain types of technologies may reduce their environmental and social footprint. Garments that comprise transformation technologies offer more versatility, potentially reducing consumption, as discussed in the Function section. Loker (2008) states, “In some advanced technical fibers and fabrics where colour, thermal function, moisture, protective functions such as sun protection, or style can change on demand during wear

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or across different wearing sessions, consumers would need fewer clothing articles to achieve both physical and psychological comfort” (p. 102). Technology seems to be a high-potential avenue for Gaia & Dubos and its sustainable agenda.

Reduction of Waste

Garments can be designed in a way that they considerably reduce or eliminate fabric waste. Aakko and Niinimäki (2013) explain,

[...] wasting fabric in the manufacturing stage means wasting all resources, such as fibres, dyes, chemicals as well as water and energy that are used in producing the raw fabric. Granted, the leftover fabric can be utilised in other products or as scraps, but it can be argued that this is not a sufficient way to manage the fabric. (p.70)

Therefore, designing patterns so they utilize completely fabric widths, from selvedge to selvedge, may completely eliminate waste from off-cuts. Rissanen (2008) recommends using the selvedge internally to stabilize certain parts, such as necklines or armholes, or as an edge finish, such as a hem. He also explains that layers of fabric cut-offs can be used to add body to thin textiles instead of using interfacing. The zero-waste method represents a challenge for designers, since all pattern pieces must border the other pieces and all the fabric has to be included in the garment (Aakko & Niinimäki, 2013). Gaia & Dubos should opt for a reduction of waste strategy when designing products.

Sourcing Strategies

This chapter covers the best environmental and ethical practice when it comes to material sourcing. Sustainable materials, dyes, after-treatments and other sustainable criteria are assessed. Fibres that are not mentioned in this essay may be considered damaging to the environment and/or human health. Furthermore, materials that require killing animals will not be discussed in this section, as Gaia & Dubos does not want to be associated with the ethical dilemma, even though they might represent sustainable alternatives.

Sustainable Materials

Organic cotton. Conventional cotton leads to major environmental and human health impacts due to intensive use of toxic chemicals and high water consumption. Organic cotton represents a more sustainable alternative, potentially reducing overall product toxicity by 93% and employing multiple ethical production principles (Allwood et al., 2006; Fletcher, 2014).

According to Hustvedt and Bernard (2008), organic fibres are “produced without using most pesticides, petroleum or sewage sludge-based fertilizers [genetically modified] ingredients [...]” (p. 493). Other sustainable alternatives may include cotton that is low chemical, hand picked, rain fed or drip irrigated; however organic cotton represents the least damaging choice (Fletcher, 2014).

Nonetheless, high demand for cotton may impede fibre diversity. Niinimäki (2013a) explains, “because diversity is an important value in sustainable development it is important to have variety in textile fibres. Accordingly the current predominance of cotton [...] can be seen as a problem from the viewpoint of diversity” (p. 20). Furthermore, even though organic cotton is a highly sustainable alternative, it cannot fulfill global demand due to high costs and slow

production cycles (Baugh, 2008). Fashion brands need to incorporate other types of sustainable fibres into their collections to promote fibre diversity.

Hemp. Hemp also represents a highly sustainable alternative. Not only does it grow very rapidly, but between 20 to 30% of the plant is fibre, and yield is far superior to other crops. Since its production is so profitable, its ecological footprint is reduced by about half of an equivalent volume of cotton (Alden, Proops & Gay, 1996; Allwood et al., 2006; Black, 2008). Furthermore, hemp requires far less water than cotton and naturally controls pest, weeds and mildew, requiring minimal amounts of chemicals (Baugh, 2008; Niinimäki, 2013a). Black (2008) states, “as such, hemp growing is already naturally close to being organic, even without any certification” (p. 128). It can also help clear land for other crops since it improves the soils and controls erosion, and can be grown in cool climates, offering the possibility to source it locally for a Canadian brand like Gaia & Dubos (Alden et al., 1996; Niinimäki, 2013a). Furthermore, hemp can help decontaminate polluted soils. Nonetheless, it absorbs heavy metals contained in the soils; thus, when the fibres exceed the maximum permissible concentration⁴ (MPC), it cannot be used for textile industry (Angelova, Ivanova, Delibaltova & Ivanov, 2004).

Hemp can be fully used for many purposes, which makes it a highly sustainable crop. Black (2008) explains, “the seeds make oils and foodstuffs for animals and humans, the woody stems produce the fibres for textiles, ropes or paper and the remaining tough fibres are used for building materials and the leaves produce animal bedding” (p. 128). Lastly, since hemp is very hardwearing, a garment made of this fibre may survive laundering better than cotton, potentially reducing consumption overall (Black, 2008). It is also thought to be more resistant to shrinkage and fading in the sun than cotton (Allwood et al., 2006).

⁴ Approved for Bulgaria

Linen (flax). The production of linen, which comes from flax fibre, commonly uses chemicals to promote growth and control weeds. However, flax could be grown with no or little fertilizers, as long as water is available. Organic linen is therefore a more sustainable alternative. Furthermore, flax may help re-cultivate soils polluted with contaminants, and since extensive irrigation is not required for this type of crop, its ecological footprint is relatively low (Kozlowski, Mankowski & Baraniecki, 1994). Nonetheless, flax has been proven to absorb and accumulate heavy metals from polluted soils. Just like hemp, when chemical content is higher than maximum permissible concentration (MPC), it cannot be used for textile industry (Angelova et al., 2004).

Flax fibres need to be degummed from the stalk through a process called retting, which traditionally involves letting the stalk rot in water to separate the fibre from the woody core. The process is highly polluting to water (Riddlestone, Desai, Evans & Skyring, 1994). Best practice involves techniques such as field or dew retting and enzyme retting, which avoid pollution associated with the traditional method (Sustainable Solution Design Association, 2001; Fletcher, 2014). Often, flax fibres need to be bleached because of their off-white or brownish colour, which is achieved most of the time through chemical processes (Black, 2008). Nonetheless, linen is very strong and highly durable, potentially reducing garment consumption (Black, 2008).

Other bast fibres. Ramie, jute and kenaf are other sustainable materials that pertain to the family of bast fibres, just like hemp and linen. They are very resistant to mildew, bacteria and/or insects, which decreases the need for agricultural chemicals, and are very strong, which increases durability in an attempt to reduce overall consumption (Baugh, 2008). Other plant fibres may represent sustainable benefits, such as pineapple and banana fibres, sisal, nettle fibre, coconut fibre and sasawashi (made of rice paper). Nonetheless, most of these fibres are typically grown in

warmer climates, reducing the opportunity for Gaia & Dubos to source locally.

Peace silk. Traditional methods for silk cultivation lead to the premature death of silkworms. In fact, to preserve the length of fibres, the silkworms are stifled by heat before they naturally break out of their cocoon (Black, 2008; Fletcher, 2014). Peace silk, also called wild silk, is a type of non-intensive cultivation that gathers cocoons from the moths' natural habitat. Farmers allow the chrysalises to break out of their cocoon naturally once they have reached maturity. This type of silk is thought to be lower quality since the filaments need to be broken to allow the chrysalis to escape. A higher quality alternative is Tussah silk, which is often grown commercially. The silkworms leave a neat hole when spinning their cocoon, enabling them to escape it without breaking the filaments. Furthermore, since most Tussah silk remains undyed, it represents a highly sustainable route (Black, 2008).

Once the chrysalises are extracted, silk filaments usually need to be degummed to produce lustrous white fibres. This process requires high quantities of hot water and detergents. Nonetheless, the wastewater is usually discharged to ground water, which acts as a low-level pollutant (Fletcher, 2014). Nonetheless, raw silk is a type of silk that is not degummed, representing a better alternative for the environment.

Pesticides and fertilizers are often applied to the trees in which traditional silk is cultivated, although in small amounts (Slater, 2003). Organic silk is therefore a better environmental choice. Moreover, silk cultivation can be very energy intensive because of the need to supply clean air and to regulate climate. Nonetheless, silk is biodegradable, which makes it easy to compost (Black, 2008). Fashion brands should thus opt for peace of wild silk, Tussah silk, raw silk and/or organic silk. Nonetheless, most silk cultivations are located in Asia, reducing the potential for Gaia & Dubos to source locally.

Organic soybean. Soybean fibre is made from protein, either from the vegetable (soybean) or the animal (milk), in which case it is named casein (Brooks, 2005). This type of fibre is fully biodegradable and “waste can be used as animal feed once the protein has been extracted” (Fletcher, 2014, p. 41). However, commercial and large-scale soybean farming uses large quantities of water and chemicals, and relies on genetically modified seeds (Fletcher, 2014). Organic soybean fibre is therefore a more sustainable alternative.

Cow milk. In the past years, a new textile material made with cow milk has been developed (Li & Zhu, 2004). The advantage of this fibre is that it can use expired milk not suitable for human consumption, therefore preventing it from being thrown away.

Organic wool. The use of chemicals, which are applied directly to the animals, is very common in wool cultivation. These chemicals can have major impacts on human and animal health and ecosystems (*ENDS Report*, 2006). Organic wool is therefore a more sustainable option, where no chemical is used during cultivation and where the sheep are reared on organically grown feed (Fletcher, 2014). Furthermore, Longwell, Miller and Schreiweis (2007) explain that the incorporation of browsing animals in farming practices is a sustainable way to control weeds.

Black (2008) signals other unethical practices seen in wool cultivation, “such as causing the hair to fall out easily by feeding the sheep particular chemicals or growth hormones” (p. 136). Museling is also a widespread issue, “in which the sheep have some of the wool-bearing skin from their tail and breech area removed to prevent ‘flystrike’” (Black, 2008, p. 136). Thus, fashion brands should opt for ethically certified farms when sourcing wool to avoid such dilemma.

The process of scouring, during which raw wool is cleaned, leads to significant environmental impacts. The European Commission (2003) explains that scouring requires large amounts of hot water and solvent, and “produces an effluent (wool grease sludge) with high suspended-solids content and a high pollution index” (as cited in Fletcher, 2014, p. 15). Furthermore, it is estimated that around 45% of the material is lost during this phase (Barber & Pellow, 2006). Fashion brands should source wool from factories with strict effluent treatment protocols or in which the solvent is reclaimed or recycled. Nonetheless, overall energy use in wool production tends to be relatively low when compared with other natural fibres (Fletcher, 2014). Fashion brands should opt for organic and/or ethical wool and ensure the scouring processes are strictly monitored and regulated by asking further information to the suppliers.

Lyocell. Lyocell, also known as Tencel®, is an ecological manmade fibre made from wood pulp originating from renewable and sustainably certified forests (Black, 2008). This material is entirely biodegradable and renewable, and its production was designed to be environmentally friendly since it is manufactured in a closed-loop system (Chen & Burns, 2006; Baugh, 2008). This process recovers and reuses about 99.5% of the solvent used to dissolve the cellulose (Allwood et al., 2006; Baugh, 2008; Black, 2008; Fletcher, 2014). Fletcher (2014) explains that “the solvent itself is non-toxic, non-corrosive and all the effluent produced is non-hazardous” (p. 38).

Other environmental benefits of Lyocell include “no bleaching prior to processing as the fibre is already ‘very clean’; reduced chemical, water and energy consumption in dyeing; and effective low-temperature laundering” (Fletcher, 2014, p. 40). However, this fibre is quite energy intensive and still produces waste and emissions (Fletcher, 2014).

Polylactic acid (PLA). Polylactic acid (PLA) is made from corn and uses less fossil fuel and releases lower amounts of greenhouse gases than other petrochemical fibres (Allwood et al., 2006). It is entirely renewable and biodegradable in specific conditions (*EcoTextiles News*, 2007; Black, 2008; Hustvedt & Bernard, 2008). This fibre pertains to a cradle-to-cradle system, in which it can return to the soil to nourish another crop (McDonough & Braungart, 2002). It absorbs and retains colour very easily, diminishing the need for dye, chemicals and water, although dyeing PLA may affect its biodegradability (Allwood et al., 2006; Black, 2008).

Even though PLA is considered sustainable, it still leads to environmental and ethical impacts. Mowbray (2001) explains,

These include the negative effects associated with large-scale, intensive agriculture of the feedstock, [...] a food stuff which is diverted away from mouths to fulfil demand for fibres; and the problems associated with landfilled biopolymers including the generation of methane, a powerful greenhouse gas, an increased level of eutrophication, eco-toxicity and production of human carcinogens. (as cited in Fletcher, 2014, p. 37).

PLA should thus be used moderately and fashion brands should prioritize small-scale and/or organic farmers.

Recycled or Reused Materials. The industry of textile recycling plays a major role in sustainability. The European organization MADE-BY classifies recycled fibres into the textile material category having the least environmental impact (MADE-BY, online). Indeed, recycling or reuse of textiles has great value in terms of energy saving and toxic chemical reduction (Allwood et al., 2006). Hawley (2008) estimates that this industry “is able to process 93 percent of the waste without producing harmful by-products or new hazardous waste” (p. 212).

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In fact, many fibres require high amounts of resources and energy to produce, but most synthetic fibres derived from petroleum oil can be recycled easily into good quality material without losing their strength (Niinimäki, 2013a). Teijin's ECO-CIRCLE™ (online) estimates that recycled polyester requires 70% less energy to produce than new polyester. Nonetheless, Niinimäki (2013a) explains, "the process still needs a certain amount of virgin polyester material, and this approach locks us into polyester production and the accompanying oil production" (p. 18). Thus, recycled polyester seems to be a sustainable approach for a society depending on petroleum, but, in a future where this fossil fuel may be depleted, the fashion industry will have to turn to other methods. Cotton and other natural fibres are rather downcycled, or reused, but good quality recycled cotton has recently appeared on the market (Niinimäki, 2013a). Reusing materials directly as they are is obviously an energy and resource-saving alternative, eradicating the complex recycling process. Fashion brands like Gaia & Dubos could therefore upcycle old garment parts to create new designs and use recycled materials in its collections.

Mono Materials. Many environmental researchers urge designers to opt for mono materials in order to facilitate recycling and composting (McDonough & Braungart, 2002; Black, 2011; Niinimäki, 2013a). Black (2008) explains, "at present, the only fibres that can be reclaimed and recycled are monofibres without elastomeric content" (p. 150). Thus, fashion brands should prioritize mono materials and encourage consumers to recycle or compost their garments at the end of their lifecycle.

Sustainable Wet Processes

Wet processes, including desizing, cleaning, bleaching, mercerising, dyeing and printing, are the steps in textile processing that creates the highest volume of wastewater (Sustainable Solution Design Association, 2001; Mukherjee, 2015). During this phase, large amounts of

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resources, energy and toxic chemicals are used, which are considered to have various negative effects of the environment and human health (Sustainable Solution Design Association, 2001). Ancestral methods and new technologies enable lower impact during wet processing (Fletcher, 2014). Certifications are the best way to ensure manufacturers adopt sustainable processes. Otherwise, visiting the factories or asking for a detailed list of ingredients and processes can help designers determine whether the manufacturers use sustainable wet processes.

Desizing. Spinning, knitting and weaving require the use of lubricants, oils or sizing agents in order to prevent thread breakage, which need to be removed before further processing. These coatings therefore become waste and can be hard to treat, as they are slow to biodegrade (Fletcher, 2014). Desizing is the process in which size agents are removed, which requires high amounts of water and chemicals. The wastewater is therefore highly polluting, however some sizing agents can be reclaimed and reused, like polyvinyl alcohol (PVA). UNEP (2013) estimates that reusing the agents can reduce water pollution by 94%. Furthermore, rot-proofing agents added to cotton are washed out during desizing, which have tremendous human health impacts, such as “negative effects on nervous, reproductive and renal systems and for their carcinogenic properties” (Fletcher, 2014, p. 59).

Fashion brands with a desire to be sustainable should ensure their suppliers use low-impact desizing processes. They should verify that the manufacturers use biodegradable or water-soluble lubricants, recover and reuse sizing agents, use natural starches as sizing agents and low-add-on techniques to minimize the amount of size used, avoid PCPs, utilize oxidative route to remove size, ensure adequate effluent treatment and combine scouring and sizing with bleaching to save chemicals, energy and water (European Commission, 2003).

Cleaning, bleaching and drying. Most fibres need to be cleaned before they can be spun

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into yarns (Orzada & Moore, 2008). This process requires high volumes of water and detergent, which creates contaminated wastewater (International Finance Corporation, 2006). Scouring is an in-depth cleaning process that removes persistent dirt from most natural fibres; however it uses chemical that can damage both the fibres and the environment (Slater, 2003). Bleaching is used when further cleaning is required, destroying the molecular bonds of the fibre pigmentation. The traditional bleaching agent, chlorine, leads to major fibre and environmental deterioration (Slater, 2003). Hydrogen peroxide is a less harmful substitute for chlorine, however it is highly unstable and requires sequestering agents to stabilize it and optimize the bleaching process. These agents are considered to be highly polluting if discharged inadequately (Fletcher, 2014). Once they are cleaned, fibres need to be dried before they can go any further in the production chain. This process consumes a lot of energy, and produces heat and impurities, such as vaporized solvents, decomposed reagents and excess waste detergent are discharged into the air or water (Slater, 2003).

Fashion brands should ensure their suppliers provide them with materials that use sustainable cleaning and bleaching processes. They should verify that manufacturers use biodegradable or water-soluble detergents and discharge wastewater adequately, and that they opt for low-impact bleaching agents such as hydrogen peroxide, peracetic acid, ozone bleaching, and carbonizing for wool (Sustainable Solution Design Association, 2001; Slater, 2003). Fletcher (2014) also recommends that smaller manufacturers opt for sun bleaching, a highly sustainable process that requires 36 hours of direct sunlight. Manufacturers should also combine scouring and desizing with bleaching to save chemicals, energy and water (European Commission, 2003). Finally, sustainable alternatives to fabric drying include radio frequency waves and microwaves, in which only the fabric, and not the equipment, is heated (Collier & Tortora, 2001).

Mercerization. Mercerization is a chemical finish used on cotton fibres in order to make them swell and change in structure, which provides them with better dimensional stability, tensile strength and dye affinity, among other properties. Nonetheless, fibres need to be neutralized with acid and rinsed with water multiple times, which causes environmental degradation (Orzada & Moore, 2008). Orzada and Moore (2008) explain, “The wastewater from this process is strongly alkaline (IFC, 2006), but the alkali [a chemical compound] may be recovered and reused” (p. 306). Manufacturers should therefore recover and reuse the alkali from the mercerization process in order to reduce their environmental footprint.

Dyeing. Synthetic dyes, largely used in today’s fashion industry, are often carcinogenic or toxic (Slater, 2003). Certain types of dyes are highly pollutant and hazardous to human health, such as chrome, acid, reactive, cationic or basic, azoic or azo and vat dyes (Gale & Bide, 2000; Slater, 2003). Low colourfastness is also a major issue in dyeing. It can lead to bleeding and fading, therefore causing early pollution (Slater, 2003). Direct dyes may increase fastness and thus reduce waste. However, only 80% of the dye is retained in the fabric, the rest being discharged into water (Mukherjee, 2015). Thus, dyeing processes often use mordants to increase colourfastness, which usually contain heavy metals that lead to tremendous environmental and health impacts (Slater, 2003). To improve colourfastness, other low-impact techniques can be applied, such as fibre dyeing, dyes with high fixation rates and plasma treatments. The latter improves fibre surface so they can absorb dyes more efficiently (Sustainable Solution Design Association, 2001; Slater, 2003). Even though reactive dyes contain heavy metals, their colourfastness represents a major advantage. However, the adoption of low-salt reactive dyes represents a more sustainable choice (IFC, 2006). Another issue in dyeing is connected to

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polyester resistance to dyes. In fact, the synthetic fibre needs to be dyed with highly toxic carriers to help the colour penetrate the fabric (Sustainable Solution Design Association, 2001).

The outdoor clothing company Patagonia has found that many factors influence the environmental footprint of dyeing. The content and colour of the dyestuffs, fabric type and weight, dyeing facilities and equipment as well as the location of the facilities all have an influence on the overall environmental and ethical impact of the dyeing process (Sustainable Solution Design Association, 2001). Therefore, it is a real challenge for manufacturers to implement truly sustainable approaches. However, even a small reduction in chemical, water or energy use can positively influence the ecological and social footprint of a fabric.

Best practice in dyeing includes various methods. Natural dyes provide multiple benefits, such as reduced energy and water consumption, minimal allergenic effects and easier biodegradability. Fletcher (2014) explains, “natural dyes are suitable for colouring natural fibres only and in the majority of cases have no built-in affiliation for the fibre and so fixing agents (mordants) are required” (p. 65). Nonetheless, colour consistency and colourfastness are low and they are more costly and longer to operate than synthetic dyes (Slater, 2003; Fletcher, 2014). Naturally coloured fibres are also increasingly popular, where cotton or wool is tinted without the need for bleaching or dyeing (Black, 2008). However, naturally coloured fibres have been associated with problems such as short staples and fineness, which can result in lower quality and coarser textiles (Fletcher, 2014).

Furthermore, wastewater from the dye works should be biologically cleaned before it is discharged, and manufacturers should wait for the wastewater to cool down before they release it, since hot water can negatively impact ecosystems (Sustainable Solution Design Association, 2001; Mukherjee, 2015). Dyebath reuse should be more widely adopted to reduce environmental

impacts, however its process is quite complex, depending on the type of dye used (Easton, 2003). Low-water dyeing methods and pad-batch dyeing, a technique that saves energy, water, dyes, chemicals, labour and floor space could also be adopted by factories (UNEP, 1993; Fletcher, 2014). Other more sustainable techniques include waterless dyeing methods and electrochemical dyeing, where an electric current enables to regenerate and recycle dye and water from the dyebath (Milmo, 2007; Kozlowski et al., 2012; Fletcher, 2014). Disperse and sulphur dyes, which are insoluble in water, are easier to extract before discharging the wastewater (Slater, 2003). Finally, manufacturers should avoid using any type of heavy metals and should use low-liquor dyeing and opt for automated systems for dosing and dispensing of chemicals and for controlling equipment variables and maximizing efficiency (Sustainable Solution Design Association, 2001; European Commission, 2003).

Printing. Printing can be highly polluting. However, new technologies have enabled this production phase to be more sustainable (Kozlowski et al., 2012). Screen printing and transfer printing, phthalate-free printing formulations and water-based printing systems are increasingly popular (Sustainable Solution Design Association, 2001; Fletcher, 2014).

Nonetheless, digital printing is probably the most environmental alternative. In fact, the fixation rate is about 90%, compared to 65-70% for reactive dyes, and the amount of dye used is precisely controlled. Digital printing requires no thickeners or carriers that need to be washed off as waste (Tyler, 2005). *Ecotextile News* (2013) estimates that digital printing has the potential to reduce the use of energy by up to 60%, water by up to 80%, inks by up to 90%, and colour waste by up to 90%. Loker (2008) explains that digital printing facilitates mass-customization, which can potentially reduce the flow of garments in the fashion system, as discussed in Design Strategies. Indeed, digital printing can be operated at the end of the production chain so that

individualization can occur easily. Lastly, *Ecotextile News* (2013) believes that digital printing facilitates local and low-scale production.

Fashion brands should ensure the materials they source were printed with water-based formulations and/or digital inkjet printing processes and make sure they do not contain toxic solvents, thickeners or carriers (European Commission, 2003).

After Treatments. Sustainable Solution Design Association (2001) states, “There are many different forms of after treatment aimed at altering some of the fibre’s properties and providing it with new ones” (p. 53). These finishes may contain toxic chemicals, such as formaldehyde, which is carcinogenic and persistent to the environment (Sustainable Solution Design Association, 2001; Fletcher, 2014). However, modern technology has enabled these after-treatments to contain very minimal amounts of formaldehyde (Sustainable Solution Design Association, 2001).

After-treatments can make the material dirt repelling, softer, antistatic, anti-wrinkle, anti-odour, antimicrobial, etc. Most of them are applied in order to reduce the need for frequent laundering and ironing, which may reduce the environmental footprint of products (Kozłowski et al., 2012). Nonetheless, Fletcher (2014) estimates that the benefits linked to the reduced need for laundry and ironing might not outweigh the negative environmental impacts of such after treatments, while Allwood et al. (2006) believe these after-treatments reduce the overall environmental impact of garments by 15 to 30%.

The European Commission (2003) recommends asking suppliers for formaldehyde-free or formaldehyde-poor agents and recipes optimized for low air emissions and minimal energy consumption. Furthermore, fashion brands should let their customers know about the after-treatments so they can take care of their products accordingly. In point of fact, Fletcher (2014)

explains, “coatings only directly influence physical factors of laundering, not cultural or behavioural ones” (p. 102). Fashion brands need to educate their customers so they can reduce the frequency of laundry, especially for garments with special coatings.

Other Sustainable Sourcing Criteria

Quality. Quality is at the centre of sustainable consumption (Niinimäki, 2013a). Therefore, fashion brands should source high quality materials in order to make their products last longer. It is important to evaluate the material’s aging process to ensure it does not look old too fast or pill easily (Wrap, 2013; Niinimäki, 2013a).

Care. Care is also highly important to consider when it comes to material sourcing. For instance, synthetic fibres may have bigger environmental impact because they induce more sweating, leading to more frequent laundering. Furthermore, microplastics contained in some synthetic materials are discharged in wastewater, causing tremendous environmental harm (Browne, Crump, Niven et al., 2011; Niinimäki, 2013a). Laitala, Klepp and Boks (2012) also explain, “different fibers are also maintained differently, which causes variation in energy consumption during use. For example, wool is washed at lower temperature and less frequently than cotton” (as cited in Laitala & Klepp, 2013, p. 52). Fashion brands need to source their fabric accordingly and make environmental choices in regards to care.

Local. The slow fashion philosophy favours local materials in order to reduce the environmental footprint of products (Fletcher, 2014). In fact, when materials are produced and sourced locally, impact due to transportation is reduced. However, Allwood et al. (2006) and Black (2008) estimate that the use of energy for transportation of fashion products is minimal compared with the use phase; therefore local sourcing has little immediate environmental impact.

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Indeed, transportation represents only 7% of the total energy profile of a t-shirt, compared with 65% for the use phase and 24% for production (Allwood et al., 2006).

In Canada and in the United States, the country of origin of fibres does not have to be indicated on product labels (Competition Bureau, 2000; Peterson, Hustvedt & Chen, 2012). Thus, it might be a competitive advantage for fashion brands to promote their materials as locally produced. Furthermore, it has been shown with the individual interviews that the target audience favours local production, especially when products are made in the province of Quebec.

Certifications. At Gaia & Dubos, the entire production will be operated under ethical working conditions. However, the brand does have the control over the material manufacturing processes. Therefore, it needs to source materials that are ethically certified to ensure the working conditions of every worker in the supply chain are part of fair trade principles. Environmental certifications of materials are a competitive advantage but are not required since it is easier to verify the fibre, dye and chemical content.

Certifications are based on independent organisations' evaluations and are highly objective and reliable (Niinimäki, 2013a). There are more than 300 sustainable labels available for textiles, such as Canadian Organic Regime, Soil Association, Global Textile Standard (GOTS), Organic Content Standard (OCS), OEKO-TEX® and OEKO-TEX® Standard 100, Sustainable Biodegradable Products® (SBP), Ecocert and Intertek Eco-Certification, among many others (Allwood et al., 2006; Black, 2010; Cervellon & Carey, 2011). All these certifications are available to Canadian suppliers. Therefore, other sourcing strategies such as quality materials, care, local sourcing and certifications all account for a more sustainable approach.

Production, Distribution and Packaging Strategies

Production at Gaia & Dubos will be held entirely locally, so the brand has entire control over its processes and working conditions. The production agenda for Gaia & Dubos is based on the slow fashion approach, which stresses small-scale and local production, traditional skills and quality (Clark 2008; Fletcher 2010). Production strategies also include reduction of waste and sustainable certifications. Sustainable distribution and packaging strategies are also discussed in this section.

Production Strategies

Local and small scale. Products made mainly locally will allow the brand to have a reduced environmental footprint due to minimized transportation (Fletcher, 2014). Furthermore, small-scale production will improve flexibility to respond to the customers' preferences, reducing unsold inventory (Fletcher, 2010).

Artisan Communities. Instead of turning to mass manufacturing, the slow fashion philosophy promotes artisanal production, celebrating traditional skills and craftsmanship (Fletcher, 2010). Not only does this approach improve originality and versatility of designs, but also enhances the quality of life of artisan communities, providing them with a sustainable way of living. Gaia & Dubos wants to partner with small communities, locally and around the world, to celebrate traditional skills of diverse regions while providing them with a sustainable wage.

Quality over Rapidity. Fletcher (2010) explains that slow fashion emphasizes quality. Therefore, high quality products will be offered in order to promote long-lasting use. Furthermore, the organization Wrap (2013) believes it is primordial for fashion brands to operate quality tests, such as verifying the compatibility of materials, robustness of manufacturing

methods, laundering and ironing recommendations, etc. Lastly, only two collections per year should be created to limit the tempo of production and consumption (Fletcher, 2010).

Reduction of Waste. In the garment industry, large quantities of energy and resources are wasted throughout the supply chain (Aakko & Niinimäki, 2013). As discussed in the Design Strategies section, “the possibility to eliminate fabric waste from garment production lies within the stages of pattern making and fashion design” (Aakko & Niinimäki, 2013, p. 70). With a minimal-waste approach, Gaia & Dubos could save fabric, thread and electricity. Fabric cut-offs could be utilized for other purposes, either reused for small details or modular parts on garments, or sold to textile recycling manufactures or furniture companies for stuffing.

Furthermore, some technologies have enabled reduced environmental impact during manufacturing. Whole-garment knitwear, along with seamless and 3D-printed clothes can significantly reduce fabric loss and surplus production, and are far less labour-intensive than the traditional cut-make-trim method (Allwood et al., 2006).

Certifications. Gaia & Dubos could apply for sustainable certifications such as Organic Content Standard (OCS), Sustainable Biodegradable Products® (SBP), OEKO-TEX® and OEKO-TEX® Standard 100, Ecocert, Intertek Eco-Certification, Green Leaf Mark for Consumer Goods, Certified Responsible Source™, Fair Trade Canada and Fair Trade International, among many others. These certifications may increase customers’ trust and brand credibility.

Distribution Strategies

The slow fashion approach also favours local markets (Fletcher, 2010). Thus, Gaia & Dubos should sell locally as much as possible in order to reduce the ecological footprint due to transportation (Fletcher, 2014). Physical distributors should be located in the area of production, and online sales should target local markets.

Packaging Strategies

A great deal of packaging is used in the garment industry. Packaging is often the part of products that has the shortest lifespan, being thrown away after purchase (Mukherjee, 2015). Fashion brands should prioritize packaging made from renewable materials that can be recycled, composted and/or reused. Mono materials enhance recycling and composting potential, as discussed above (McDonough & Braungart, 2002; Black, 2008; Niinimäki, 2013a). Lastly, garment bags, shopping bags, labels and other packaging components should be designed for reuse after purchase.

Use, Care and Disposal

“[...] It is not the product’s responsibility to be sustainable, it is human interaction with a product that makes it sustainable or not” (Williams, Baldwin & Fletcher, 2009, p. 28). Various studies show that the greatest environmental impact of apparel occurs after purchase (Allwood et al., 2006; Chen & Burns, 2006; Fletcher 2008; Dombek-Keith & Loker 2011; Niinimäki, 2011). Consumers therefore have great power to influence positively or negatively their ecological footprint with the way they use, care for and dispose of their clothes. Even though some technological advances such as energy and water-efficient washers and dryers may reduce apparel ecological impact, behavioural changes need to be implemented to see major improvements (Fletcher, 2014). Thus, fashion brands have the responsibility to efficiently educate consumers to make eco-friendly choices when it comes to use, care and disposal of garments and accessories.

Use

It is estimated that consumers regularly wear only 6 to 38% of the clothes they own (Fletcher, 2008; Hawley, 2008; Dunne et al., 2012). Niinimäki (2013a) believes consumers must invest in high quality, durable and classic garments in order to wear them regularly for many years. Furthermore, Niinimäki (2009) and McGrath (2012) think quality garments that are more expensive may be kept longer and decrease desire for novelty. As discussed in the Design Strategies section,

Experiencing an emotional bond with a product can also result in specific protective behaviours, because people cherish their relationship with the product and want to preserve it. Accordingly, people are more likely to handle the product with care, to repair it when it breaks down, and to postpone its replacement. (Mugge et al., 2009, p. 467-468)

Fashion brands should encourage consumers to use their garments over long periods of time to decrease their consumption, positively affecting their environmental impact. Furthermore, they should educate customers to buy clothes they truly love and need, even if it leads to a reduction of sales volumes; products sold at more expensive prices may compensate for this loss.

Care

Niinimäki (2009) estimates that textile maintenance uses tremendous amounts of water and energy. For a mere cotton shirt, the impact of care can be as high as 75-80% of its total environmental impact (Lewis & Gertsakis, 2001). Encouraging consumers to use appropriate maintenance methods can improve their ecological footprint by reducing the amount of resources consumed and increasing the lifetime of clothing (Laitala, Boks & Klepp, 2011).

Laundry. Numerous studies have shown that reducing both washing temperatures and laundering frequency can have a major effect on the environment (*ENDS Report*, 2001; Black, 2008; Niinimäki, 2009; Fletcher, 2014; H&M, 2014). It is also crucial to understand that “even though automatic water reduction takes place, it has been shown that it is more resource demanding to wash with an unfilled machine” (Laitala & Klepp, 2013, p. 54). Loker (2008) also suggests that sharing equipment through community laundries may reduce one’s environmental impact due to decreased ownership. Fashion brands should therefore encourage consumers to wash their clothes less frequently and in cold temperatures, and to do laundry only when they have multiples items to wash. Shared equipment can also be prioritized by promoting its benefits and providing easy access to community laundries.

Catton (2007) estimates that only 7.5% of laundry is actually heavily soiled, the rest being washed for cultural or behavioural reasons. As mentioned in the Material Sourcing section, easy-care after-treatments may reduce the overall impact of a garment because of the decreased need to wash it (Allwood et al., 2006). However, consumers need to be aware of the coatings’ functionality to wash their clothes accordingly (Fletcher, 2014). Fashion brands need to educate consumers on the importance of decreasing laundry frequency by tackling cultural and behavioural beliefs. Nonetheless, Schwartz and Laky (2008) believe “social taboos against wearing a garment multiple days in a row is outdated, considering technological advances and modern personal hygiene habits” (p. 288).

Furthermore, the choice of laundry products can have a major impact on the environment. Detergents and other laundry products often contain potentially toxic chemicals, like phosphate (Environmental Protection Agency, 2006). Washing tablets have the highest phosphate concentration, followed by washing powders and washing liquids (Allwood et al., 2006).

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Furthermore, concentrated detergents were introduced as a mean to use fewer chemicals and less packaging, however there is a move back to standard detergents because of consumers' inadequacy in accurate dosing (*ENDS Report*, 2007b).

It is crucial to educate consumers to adopt ecological and biodegradable laundry products in order to minimize toxic chemical use (Fletcher, 2014). Fashion brands should also teach them accurate detergent dosing. Other innovations may avoid the use of detergent completely. Washing balls, soap nuts, washing pellets and laundry magnets are highly sustainable alternatives to traditional detergents (Laitala & Kjeldsberg, 2012; Fletcher, 2014). Lastly, other laundry products, such as fabric softeners, bleach and scent enhancers are often unnecessary to obtain clean clothes, and it is the responsibility of fashion brands to inform consumers on this matter.

Tumble drying and ironing. Allwood et al. (2006) estimate that tumble drying accounts for around 60% of the use-phase energy of a garment. Therefore, line drying can significantly reduce the environmental impact of clothes (Black, 2008). Minimizing ironing can also have a major effect on the ecological footprint of apparel (Allwood et al., 2006; Loker, 2008; Niinimäki, 2009). Fashion brands need to educate consumers on the proper way to dry their clothes: laying knitwear flat while hanging other garments. In addition, they can suggest alternatives to ironing, such as hanging garments instead of folding them. Gaia & Dubos could sell hand-drying racks and padded hangers, for instance, to encourage consumers to take care of their garments and avoid tumble drying and ironing.

Dry cleaning. Traditional dry-cleaning methods create emissions and residues from solvents and energy consumption. Toxic solvents used in dry cleaning, such as polychloroethylene, are often carcinogenic and highly hazardous to the environment and human health (US Environmental Protection Agency, 1995). They need to be operated in a closed-loop

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system to be fully recovered and reused in order to diminish the negative impacts. New methods of more eco-friendly dry-cleaning methods include liquid carbon dioxide processes based on silicon or an ultrasonic system, detergent-free dry-cleaning systems and a wet dry-cleaning process in which water is used in a controlled manner (US Environmental Protection Agency, 1995; Sawa, Rodriguez, Aramaki & Kunieda, 2004).

Nonetheless, garments that require dry cleaning are usually cleaned less frequently than other types of clothes, potentially diminishing their environmental impact and increasing their life cycle (Laitala & Klepp, 2013). Still, fashion brands should educate consumers about the issues of dry cleaning and encourage them to turn to eco-friendly dry cleaners.

Mending. Mending can potentially reduce the environmental impact associated with overproduction and consumption of clothing because it prolongs product life spans. However, apparel is so cheap nowadays that consumers are more tempted to replace their clothes than to mend them (Fletcher & Grose 2012). Fletcher (2008) estimates that, “reusing, repairing and reconditioning garments are some of the most sustainable choices” (as cited in Aakko, 2013, p. 40).

Fashion brands can offer their customers various services such as upgrading, updating, repairing and product modification (Niinimäki, 2011; Wrap, 2013). They can also include repair kits or spare parts with their products so consumers can mend them easily. These products could comprise further online information to help them repair their garments more efficiently (Allwood et al., 2006).

McGrath’s research (2012) shows that consumers would use their clothes longer and buy fewer garments if they knew the basis of mending. This is why Gaia & Dubos developed an

online mending training⁵ that teaches a variety of methods for repairing garments and accessories. The courses are presented in the form of short videos to which consumers can subscribe at affordable rates. When the brand will develop a garment collection, consumers will get free access to these online trainings. Fashion brands like Gaia & Dubos could also offer their customers transformation workshops to give a second life to their garments.

Other care instructions. Consumers should also be guided to take care of their clothes by storing them according to the fabric, using non-toxic cedar mothballs and pilling removal tools, and other tips to efficiently wash and dry them. Gaia & Dubos offers free videos on its blog⁶ and Youtube channel⁷ to help consumers to make the right decisions when it comes to fashion consumption and garment use, care and disposal, among other topics.

Disposal

Clothing can be disposed of for many reasons, either for product failure or for psychological changes (McGrath, 2012; Wrap, 2013). In today's fashion system, in which prices and quality are increasingly low, enormous numbers of garments are discarded (Black, 2008; Hawley, 2008). In landfills, most textiles do not decompose or take long periods of time to disintegrate, producing methane, which contributes to greenhouse gas emissions and global warming (Niinimäki, 2013a). As mentioned in the Design Strategies section, the main problem arises from the fact that most garments are not designed for composting and recycling, and often contain toxic chemicals and are made of blended materials (Niinimäki, 2013a). Niinimäki (2011) explains, "the best way to encourage sustainable development involves recycling more, using clothes until they are completely worn out, and avoiding excessive water washing and ironing"

⁵ <https://www.gaiaetdubos.com/pages/cours-de-reparations>

⁶ <https://www.gaiaetdubos.com/blogs/blogue-de-gaia-dubos>

⁷ <https://www.youtube.com/channel/UCV4nm7g236crf7-THVv4yFA>

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(p. 56). Fashion brands need to design garments so they can be easily recycled and composted and inform consumers about the issues linked to garment disposal.

Take-back service. Hawley (2008) estimates that “the textile recycling industry is able to process 93 percent of the waste without producing harmful by-products or new hazardous waste” (p. 212). She also believes the incineration of fibres for energy production can be a solution to keep textile products out of the landfill. Fashion brands like Gaia & Dubos could offer a take-back service to consumers. Garments and accessories that are returned through this system, regardless of condition, could be reused for future collections, given to charities or sold to textiles recyclers, for instance (Svengren Holm, 2013).

Leasing service. Even though reuse and recycling are eco-efficient approaches, they do not face the real problem of overproduction and consumption (Fletcher, 2008). Fashion brands could therefore offer a garment leasing service in order to diminish disposal of clothing. This system satisfies the need for variety without frequent buying of new clothes, allowing consumers to rent products for short periods of time (Armstrong, 2013; Svengren Holm, 2013). Niinimäki (2013b) explains, “the use frequency of the Fashion Library garments is high, which increases the eco-efficiency of the service” (p. 132). Furthermore, clothes available in fashion libraries are regularly repaired, increasing their life spans (Allwood et al., 2006).

Information and Branding

It is crucial for fashion brands to efficiently educate their customers in an attempt to create long-lasting behavioural changes (Williams, Baldwin & Fletcher, 2009). Umberson (2008) and Kang et al. (2013) argue that when consumers have more information about environmentally sustainable apparel, they may develop stronger intentions towards buying such products.

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Research shows that transparency is key to promote consumers' trust and brand credibility, which may increase purchase intentions (Williams et al., 2009; Cervellon & Carey, 2011; Niinimäki, 2013b). Fashion enterprises thus need to focus on communicating information transparently.

Through information and branding, enterprises can communicate their processes, values, philosophy, and engage consumers to undertake sustainable actions. Multiple topics can be addressed, such as design processes, material sourcing, production standards, distribution methods, etc. Furthermore, as discussed in the Use, Care and Disposal section, it is the responsibility of brands to inform consumers about the role they can play in reducing their environmental impact.

Since not all consumers read the care labels, it is primordial to improve care information and packaging in order to increase product longevity (Laitala & Klepp, 2013; Wrap, 2013). More visible labels or clearer information could be provided to encourage customers to take care of their garments efficiently. Furthermore, Umberson (2008) explains, "Environmental labels strengthen consumer confidence in sustainable purchases and enhance cognitive perceptions associated with the brand" (p. 18). Sustainable credentials and certifications should therefore be clearly identified on the labels.

Fashion brands can utilize multiple ways to communicate with their audience: in-store signs, window displays, videos or pamphlets; product packaging such as reusable labels; online videos, webinars, podcasts, eBooks and articles; in-person lectures and conferences; hard books, magazines and other print communications are all efficient ways to influence consumers' knowledge and behaviour. Gaia & Dubos already efficiently communicates with its audience through informative online videos and articles⁸, which reach hundreds of people each month.

⁸ <https://www.gaiaetdubos.com/blogs/blogue-de-gaia-dubos>

Discussion

This research project illuminates the urgent need to respond to consumers' interest in ecological and ethical apparel, while highlighting the importance of redirecting the fashion industry towards sustainable principles in an attempt to address issues related to the environmental crisis and human rights. This essay serves as a starting point for the development of the sustainable fashion brand Gaia & Dubos, in which the target audience's profile and preferences were determined through an online survey and individual interviews. Best environmental and ethical practice was established through the achievement of an in-depth literature review, in which numerous strategies were identified in order to become a truly sustainable enterprise.

Potential Obstacles

Even if the target audience established through this research shows great interest in buying sustainable apparel, their lack of interest for other criteria may be problematic. Indeed, in the online survey, only 50% of the respondents pertaining to the target audience say they are interested in fashion, clothing, or their appearance in general. This issue might represent an obstacle for Gaia & Dubos when marketing garment collections. Therefore, it is of crucial importance for the brand to efficiently communicate its sustainable credentials with its customers to generate trust and increase sales. Nonetheless, the target audience still needs to get dressed, so Gaia & Dubos can target them with the right marketing strategies and designs, even if they are not interested in fashion, clothing and their appearance.

As discussed above, the target audience seems reticent to buy garments online. Thus, Gaia & Dubos should focus on reducing perceived risk attached to online buying. By providing the

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consumers with detailed size charts and offering free shipping and returns, among other strategies, the brand will be able to diminish perceived risk and increase online sales.

Another obstacle that may be encountered by Gaia & Dubos is the difficulty to source locally in Canada, since textile manufacturing mostly occurs in developing countries (Niinimäki & Hassi, 2011). The brand needs to research local suppliers thoroughly in order to develop long-lasting relationships with them and to ensure they are truly sustainable. Verifying their trustworthiness in relation to sustainability can be easily achieved if the manufacturers and/or suppliers possess environmental and ethical certifications, while deep investigation needs to be done if they do not have any.

Bias and Limitations

As mentioned above, only 12 respondents pertaining to the target audience answered the online survey, which represents only 7.89% of the total sample. Thus, even if this age bracket seems to embody the audience pursued by Gaia & Dubos, this might be biased as a result of the limited number of respondents corresponding to the target age group. This is why Gaia & Dubos chose to broaden the age of the target audience to 35-55 years old in order to make sure to generate decent sales among a wider audience. By rounding up the target audience's age, the brand ensures it reaches a greater number of potential customers and includes a broader age range into its marketing strategies.

Furthermore, the samples for the online survey and the individual interviews were created through the method of snowball sampling. Therefore, the participants mainly pertain to the researcher's circle. Indeed, it is possible to observe that the samples correspond to the researcher's own demographics, which are predominantly educated Caucasian women with a relatively high income. This brings an ethical dilemma to the surface: are ecological and ethical

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high-end garments only destined for rich, white and educated customers? Are they the only ones responsible for saving the planet? Or are they the only demographic group that has the right – or the privilege – to invest in more expensive clothing? It could be speculated that mostly high-income people invest in sustainable garments, since the ecological and ethical credentials of products often increase their retail price. Gaia & Dubos encourages governmental regulations in regards to sustainable goods in an attempt to readjust the retail prices to the competition. With governmental subsidies, ecological and ethical brands like Gaia & Dubos could expand their audience to middle income customers, which would potentially begin to redress the imbalance.

However, taking the dilemma further, can it be assumed that rich and educated people are almost exclusively Caucasian? This would represent a colonial issue linked to white supremacy, and Gaia & Dubos does not want to encourage this worldview. Therefore, even if the majority of the research participants pertaining to the target audience are Caucasian, the brand will deploy marketing strategies that represent ethnic diversity. In point of fact, Barry (2012) states, “Marketers targeting North Americans should select models who match their size, age and race traits [...]” (p. 3). He also explains that consumers do not want to see idealized models in advertising, but rather models “that will allow them to imagine genuinely how products will suit them and to feel empowered by brands” (p. 3-4). Therefore, in order to attract consumers of diverse backgrounds, Gaia & Dubos will represent women of various ages, ethnicities and body types.

Appendices

Appendix A

Photographs and description of the participants' garments

Participant 1

Grey knitted sweater with pleats at neckline. Bought at a craft show in Montreal at a Quebec designer stand.



Participant 2

Off-white knitted sleeveless top with trimming at neckline and armholes. Owned it for 25 years old.



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Participant 3

Red knitted short-sleeve A-line dress. Yoke and pocket flaps at hip level. Bought in a Quebec store but made in Asia.

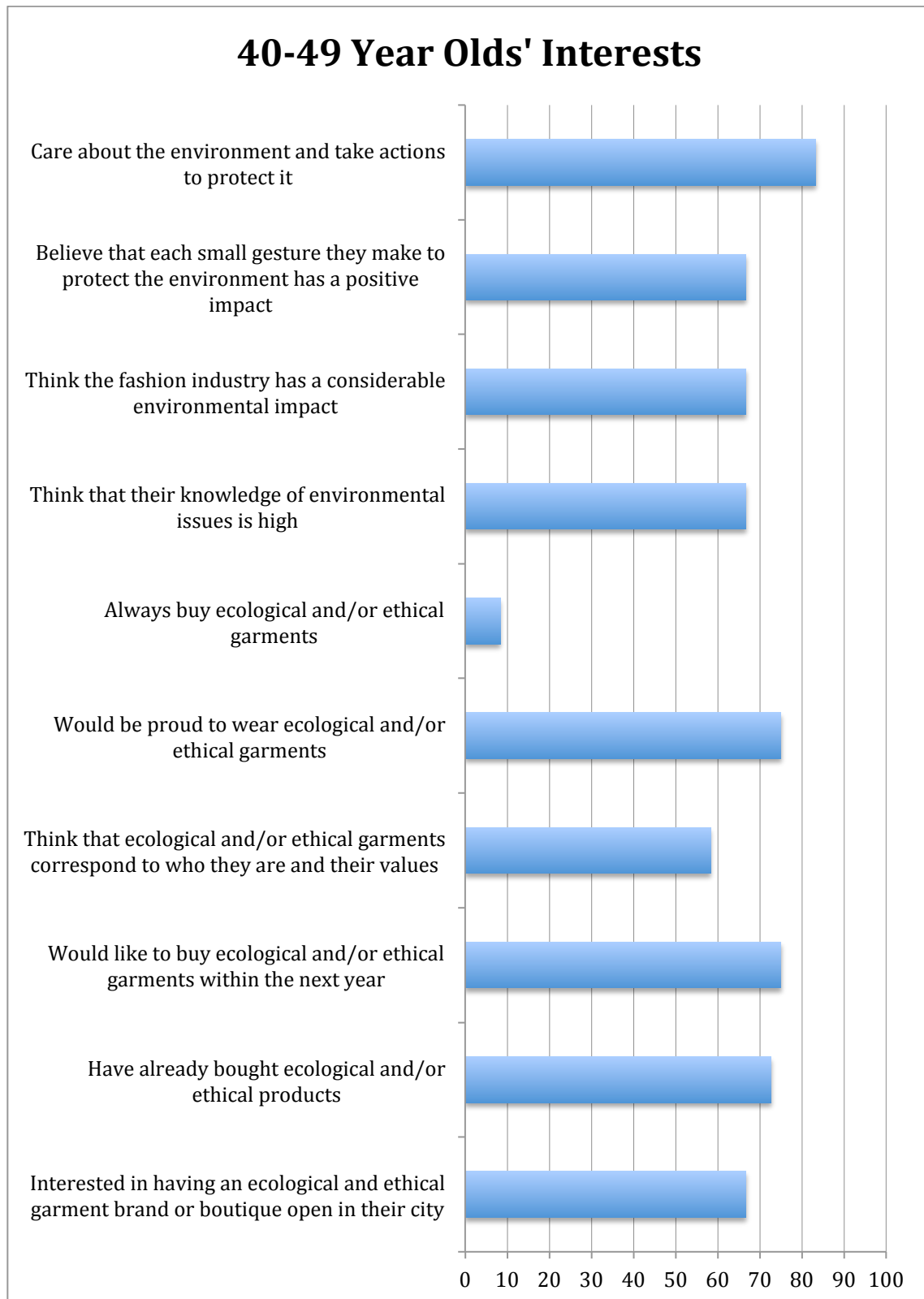


Participant 4

Grey knitted sweater with V-neck. Bought at a thrift store in Quebec City.

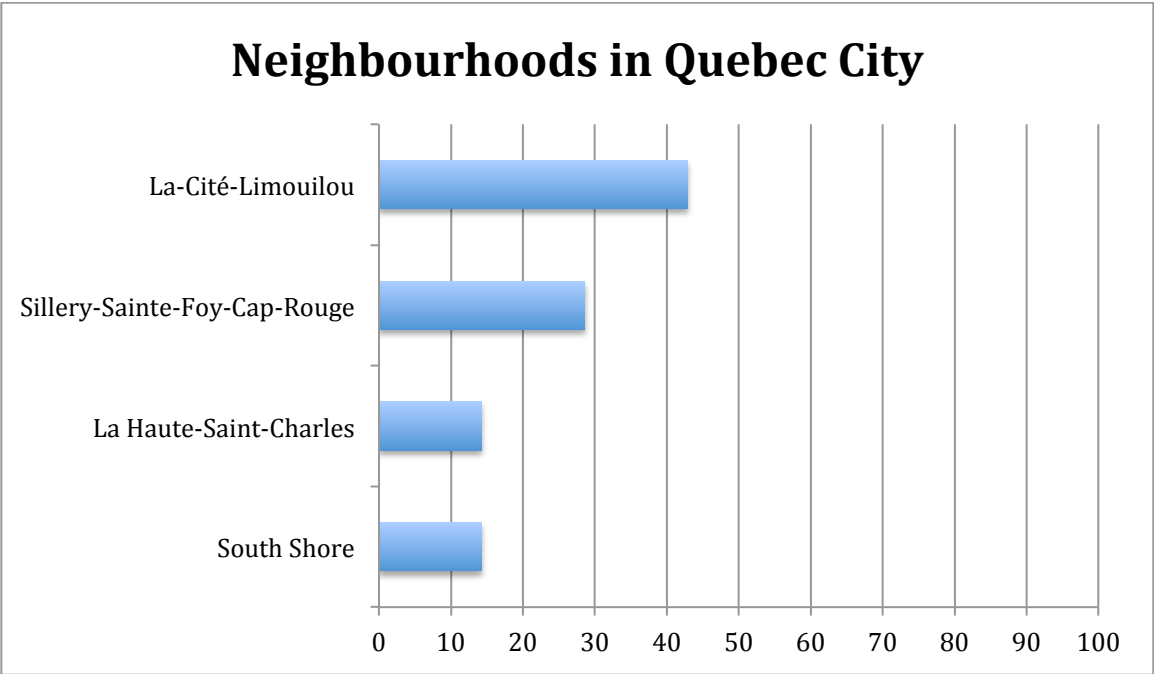


Appendix B
40-49 Year Old's Interests

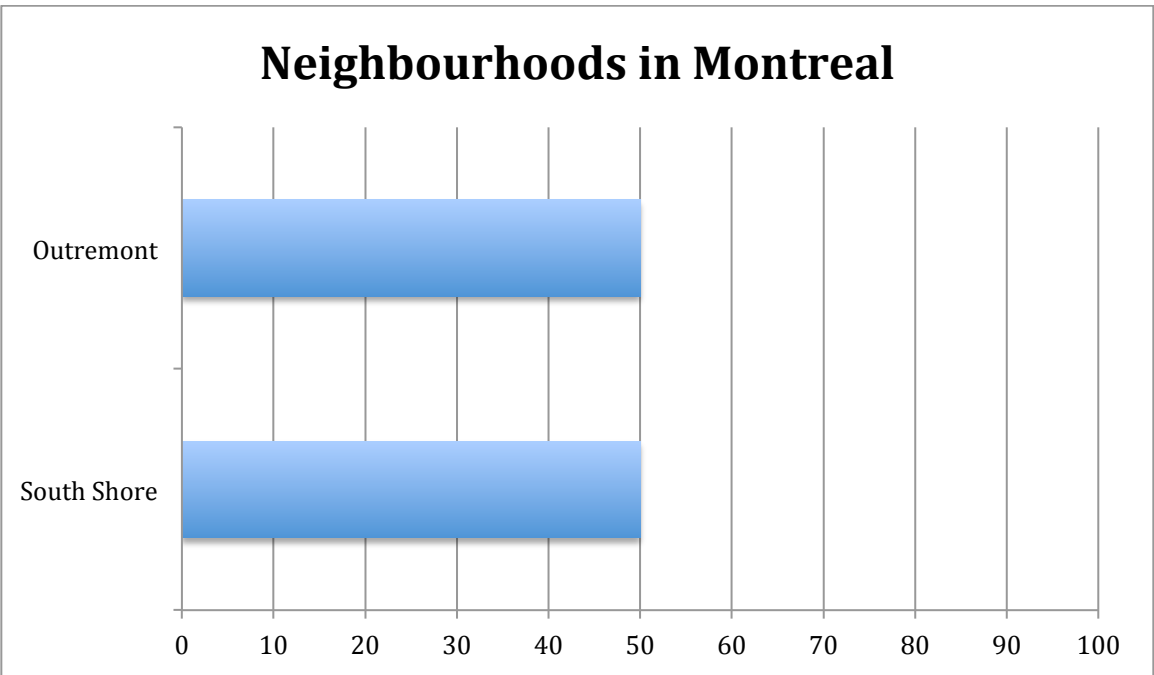


Appendix C
Demographics

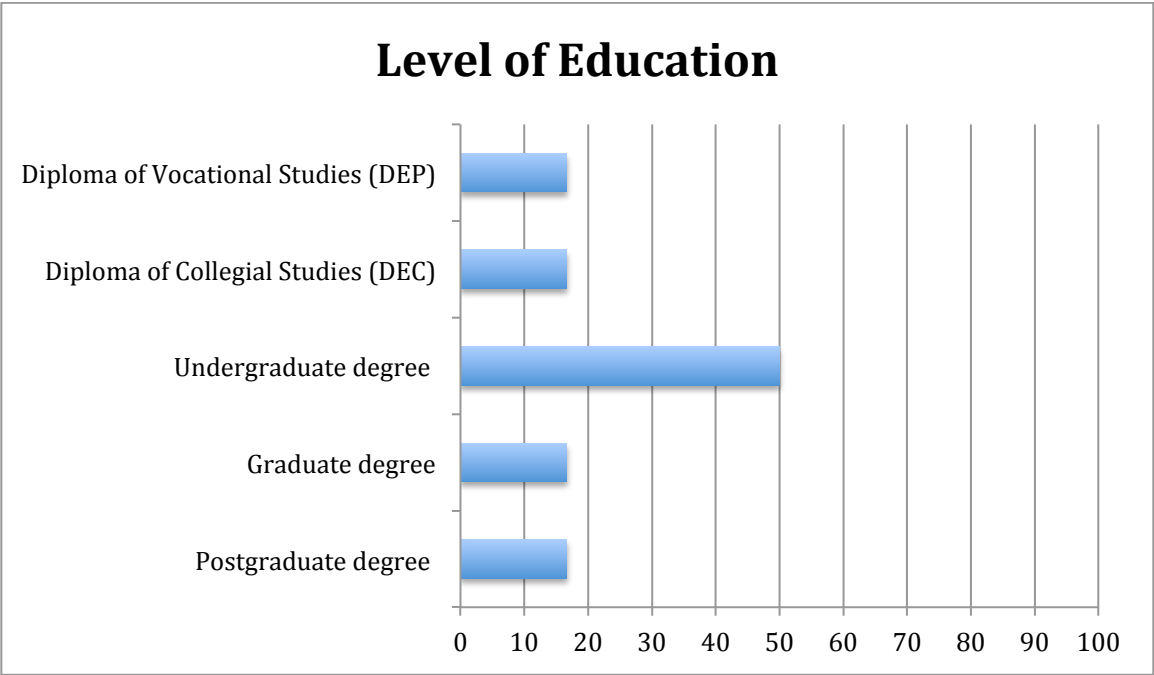
Appendix C1



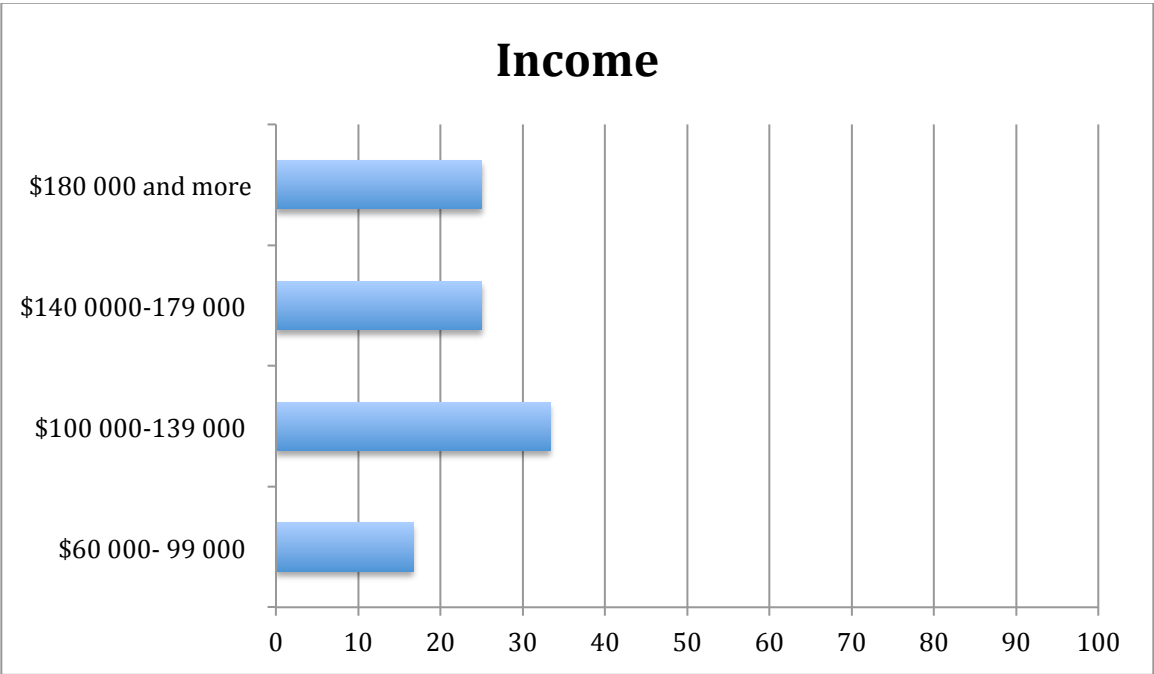
Appendix C2



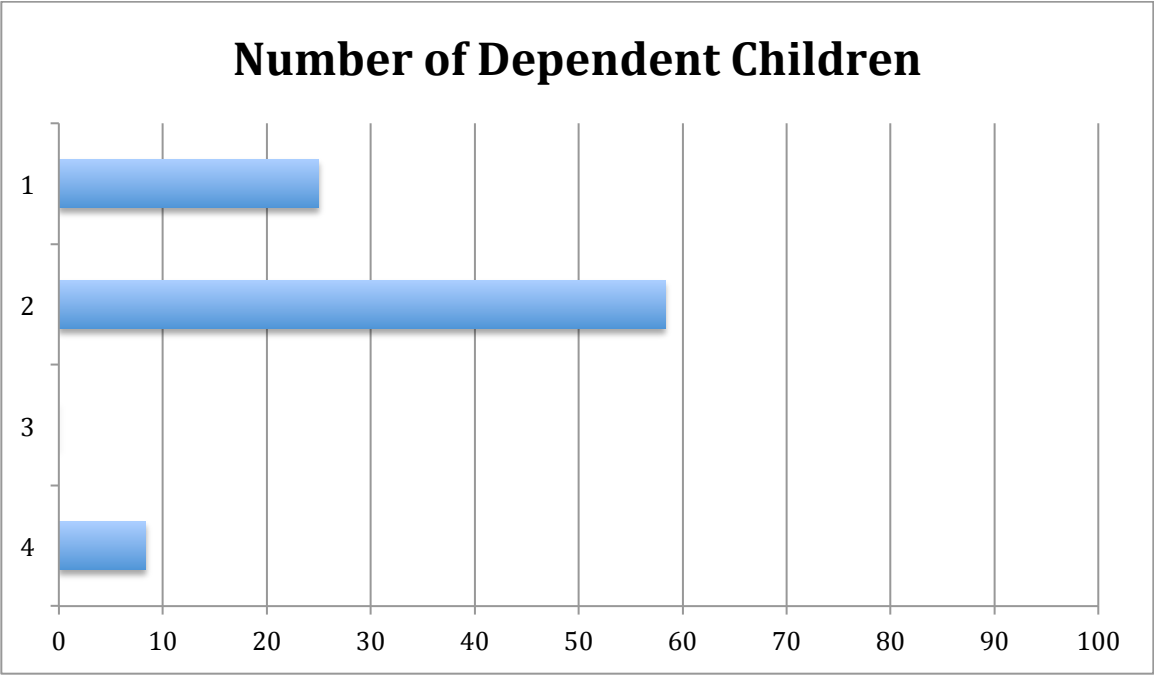
Appendix C3



Appendix C4

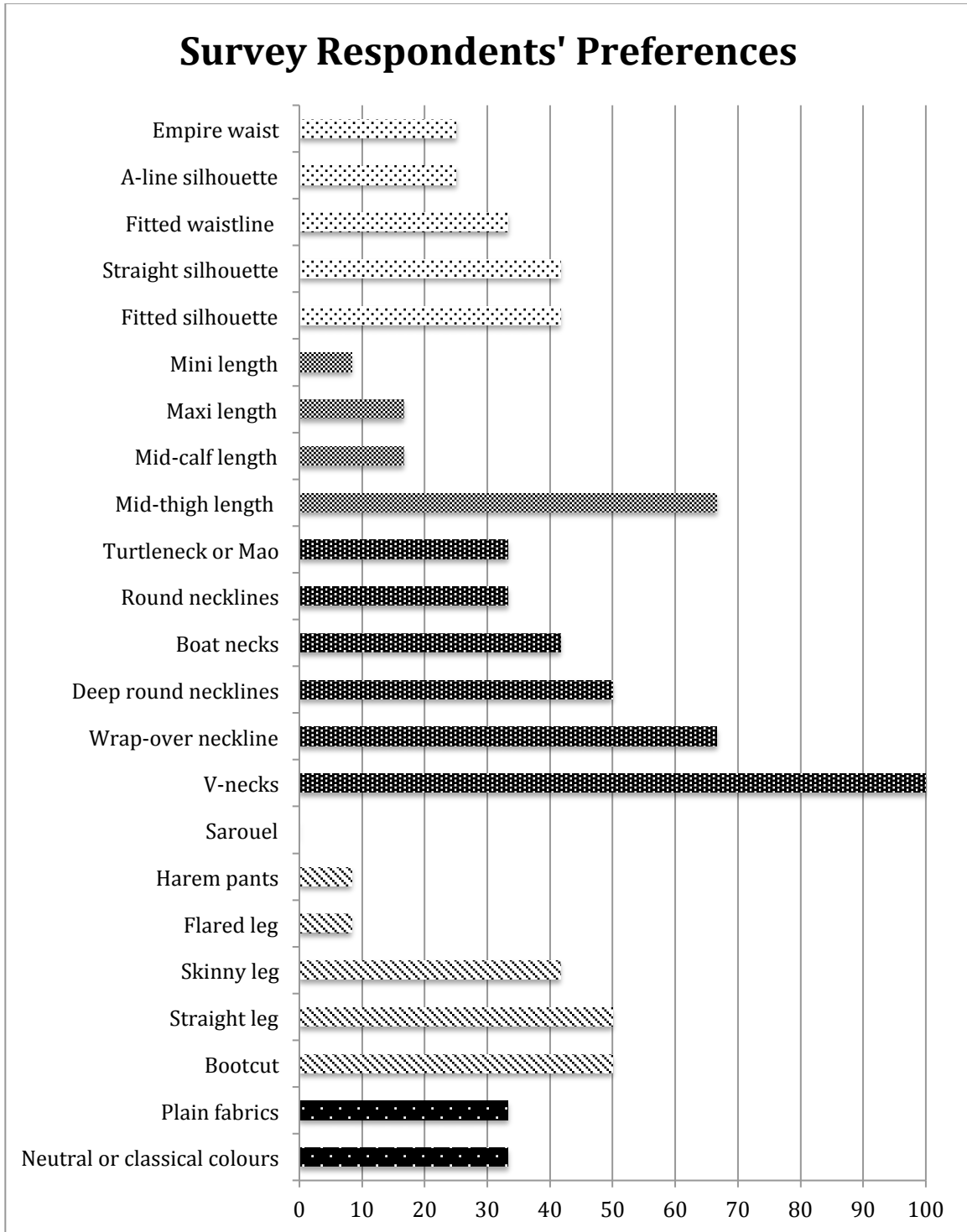


Appendix C5

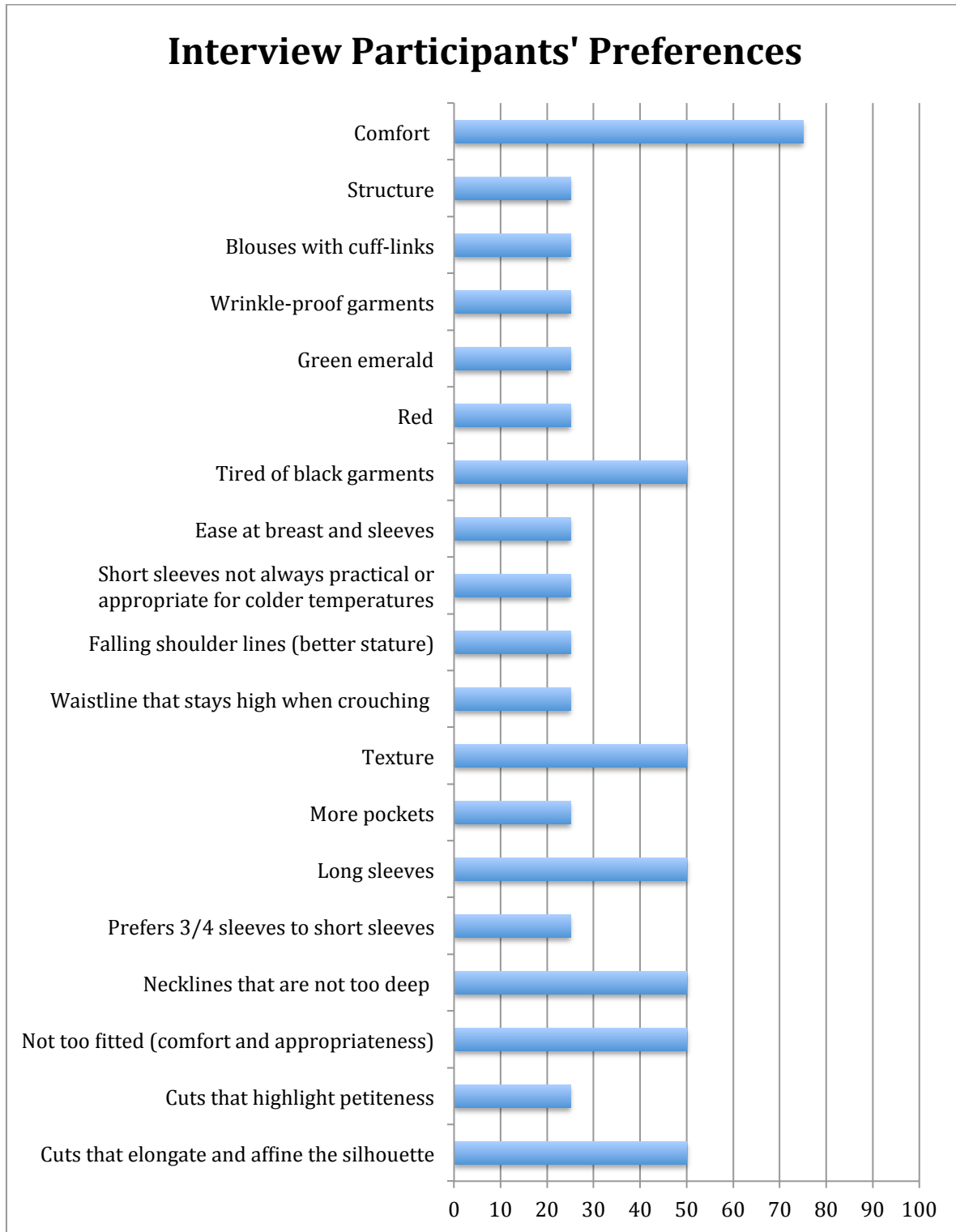


Appendix D
Design Preferences

Appendix D1

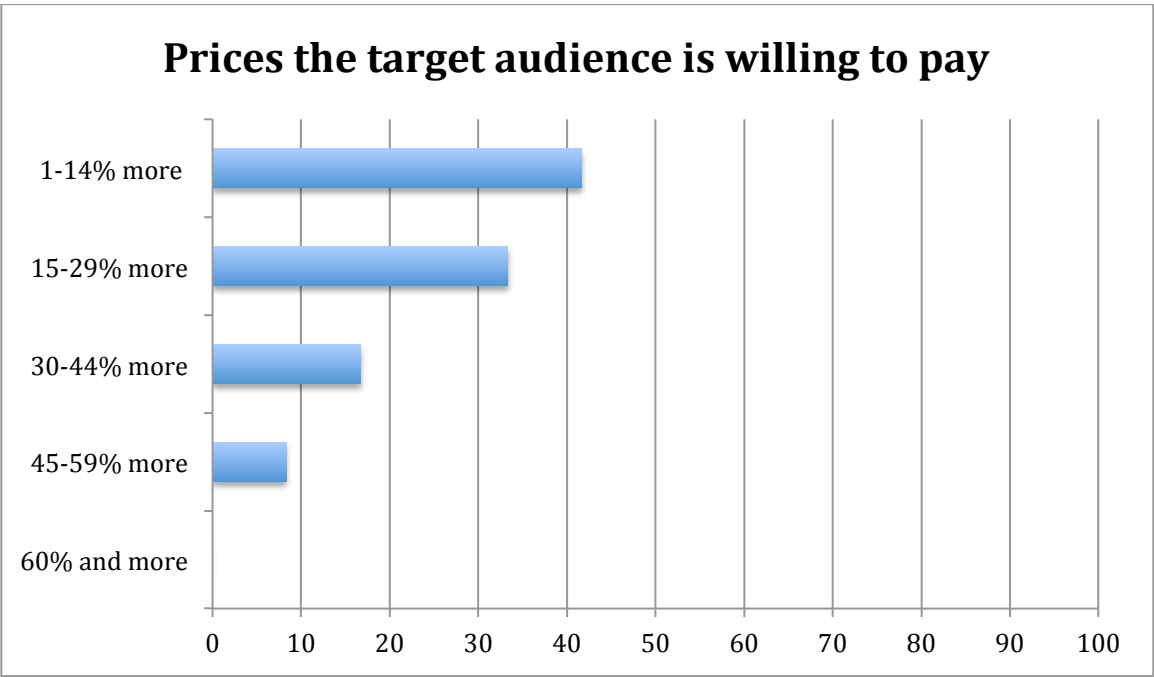


Appendix D2



Appendix E

Prices the target audience is willing to pay for ecological and ethical garments compared with non-ecological and non-ethical garments



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