LESS DESIGN, BETTER DESIGN: A CASE STUDY IMPLEMENTING C2CAD MODEL USING ECO-DESIGN AND MINIMALISM

by

CARLEE STEPHENS

(under the direction of Laura McAndrews)

ABSTRACT

Every element within the design of a garment determines longevity, quality, uses, and ultimately its lifecycle. Designing for circularity promotes sustainability by generating a longer life for a garment beyond its wearable life (Piller, 2022). To achieve sustainable development, practices such as Cradle-to-cradle Apparel Design, are implemented to promote circular design practices to prevent garments from becoming waste (Gam et al., 2009). The purpose of this study was to explore the processes of a New York based luxury fashion company and their strategies for apparel design that results in high-quality pieces that are made to last, made to be worn, and made to have "multiple lives." The findings of this study showed that designing with intention allows designers and users to create connections and build relationships that ultimately result in better, long-lasting design. This study has implications for the case study, MONO, the fashion industry, academia, and government policy makers.

INDEX WORDS: cradle-to-cradle apparel design, circular design, eco-design, minimalism, sustainable design, and sustainable production

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| | |
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May 2023

# DEDICATION

This research is dedicated to a few people that knowingly and unknowingly molded me and shaped my views to what they are today. First, I would like to dedicate this to the woman who made me, who unconditionally loved and supported me, my mother. Growing up, my mother repeatedly told me that "brands don't matter" when I did not like a piece of clothing – which at the time did not make any sense to me. When I heard this, I was puzzled because I thought "it isn't the brand, it's ugly" or "it isn't the brand, it's poor quality" or even "it isn't the brand, it's just not me." Unknowingly, by her saying "brands don't matter," she taught me what does – the aesthetic appeal, the construction, and the way I felt in clothes and how I connected and identified within my clothes. Over the years, I realized that by saying this, she taught me that brands don't matter, but the intention, integrity, and people behind them do.

I also would like to dedicate this to the person who also made me care about my clothes, as well as the environment, my late Grandfather, Papa. Six out of the seven days of the week (and sometimes seven if he changed after church), Papa would undoubtably be found wearing a Life is Good t-shirt from his vast collection of the brands t-shirts that were double (or triple) my age. This became part of his identity as these t-shirts met his every functional, expressive, and aesthetic needs. Wearing something that met his needs (maybe unknowingly) he truly reflected the meaning behind these t-shirts every single day. Never getting rid of a single one and wearing them until there were gaping holes, but he did not care, as he had a strong connection to each one, he showed me the importance of having connection with our clothes that allows us hold onto them, as well as wearing clothes that reflect who we are. To him, life was good, and his t-

shirt said it front and center. He also deeply cared about the environment, recycling, and global warming. He did not have to care, as he was old, and the world was going to be in one piece for the rest of his days. But he cared because of his grandchildren, my brothers, sisters, cousins, and I. Sustainability is all about sustaining and preserving the world for future generations, which he emulated until his last day. He instilled a deep, unending care in me for the environment, for the future, and I hope to make that count while I still can.

Lastly, I would like to dedicate this to the wonderful individuals that took my view of the fashion industry and threw it out the window. In an industry that predominantly cares about chasing trends, underpaying employees, finding the cheapest labor, all in the name of making a quick buck, I decided to get my masters with the idea that I will get a better paying job. I now know that is unlikely, because I learned this is also an industry that cares about experience and not education. However, furthering my education in the past year taught me something more valuable than that better paying job I thought I wanted and the experience I could have had. It taught me that there is hope out there to be a part of a community and company culture that isn't dedicated to chasing trends or finding cheap labor to produce a low-quality over-produced product all for the sake of making more money. So, this is dedicated to the people at MONO. This incredibly special group of people taught me more than they could ever know. They taught me about the importance of the care, integrity, meaning, and overall intention that, when put into a garment, can create a piece that is made to make a person feel good in for a lifetime. They taught me the importance of connection and relationships with people you work with in creating something this special, as well as the relationships with people who wear the pieces. These relationships are essential to truly allow the pieces to be what they are intended to be, which are remarkable pieces, made for life.

ACKNOWLEDGEMENTS

I want to thank my committee – Dr. Laura McAndrews, Dr. Maureen Flint, and Dr. Yoo-Kyoung Seock. Thank you for believing in me and my topic. I especially want to thank Dr. Laura McAndrews for being patient and providing endless guidance and support throughout this process. I am deeply appreciative for all her help and most of all her encouragement. She always found ways to give me encouragement and never made me feel like my work was anything less than valuable. By being interested, engaging, and invested in me and my research when she didn't have to, I have truly found my biggest cheerleader in Dr. McAndrews. She is the best advisor, professor, mentor, and cheerleader I could have had during this process.

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# CHAPTER 1

# INTRODUCTION

Chapter 1 contains the following sections: (a) background of study, (b) purpose of study, and (c) significance of study.

Though sustainable design has been discussed in both industry and academia, limited scholarly research linking Cradle-to-Cradle apparel design and practice in the fashion sector exists, and this thesis serves to address this gap. Interviews with the creative director, as well as, the design and production teams of a New York City based luxury apparel company provided context to what sustainability looks like for their design and production process. This research aims to identify strategies in sustainable apparel design currently utilized in the fashion sector through a case study analysis of a New York based fashion luxury fashion company. The study's findings contribute to the discussion on new and developing sustainable pathways for changing the fashion design and production sector.

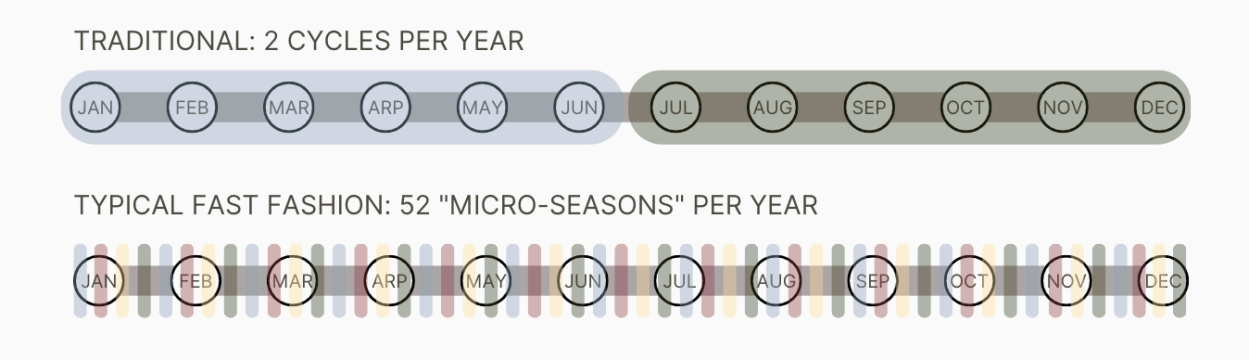
## Background

The apparel industry has been characterized as hyper-dynamic with several companies competing for scarce resources (Ha-Brookshire and Dyer, 2008). To exasperate the hyper-dynamic apparel industry, the fast fashion model has accelerated over-production of cheap clothing to meet consumers' rapidly evolving "trendy" demands (Brewer, 2019). Fast fashion produces up to 50 cycles a year (Figure 1.1) compared to the traditional two cycles a year (Spring/Summer and Fall Winter) to continually refresh products based on rapidly changing

trends. Fast fashion, which has become a large sector of the apparel industry, operates on the cradle-to-grave lifecycle model. The cradle-to-grave model has been the predominate system the apparel industry has operated, transferring raw materials into product, distributing to consumers, and being used until the product reaches the end of its 'useful life' (Henninger et al., 2020).

**Figure 1.1**

*Traditional fashion production cycles vs. "fast" fashion production cycles.*




*Note*. Figure adapted from Drew & Yehounme, 2017

This has created a reckless throw away culture for consumers by creating cheap, seemingly disposable garments that can be easily replaced by another cheap "trendy" piece – which has a significant environmental impact (Brewer, 2019). Each year only around 12% of material used for apparel is recycled globally, mainly due to the construction and materials used for apparel and insufficient technology to recycle these garments (Igini, 2022). This results in a seemingly never-ending vicious cycle of producing more insufficient apparel due to consumers demanding more garments to ultimately throw away or results in a change.

As fast fashion grew, so did researchers, activists, and ethically conscious brands to change the dominant cradle-to-grave model. The change starts by shifting to making slow

fashion practices at the design and production level (Fletcher, 2015). According to Fletcher, opposite to fast fashion, slow fashion is "understood literally and equated with, say, durable products, traditional production techniques or design concepts that are season-less" and additionally, slow fashion is used to "differentiate garments produced in the growth fashion model in a fresh way; to offer a new marketing angle on products and brands that happen to have a long heritage, durable pieces or classic design" (Fletcher, 2015, para. 6). This means making conscious decisions regarding design and production at a higher level is paramount to cultivating a sustainable process. A higher level of quality, higher level of design thinking, higher level of recognition for what longevity looks like for apparel. Fletcher states that "Longer-lasting materials and products are often promoted as a strategy to increase resourcefulness and sustainability across product groups including fashion." (Fletcher, 2015, para. 1). Higher level does not necessarily mean more difficult, a higher-level means looking at what lasts, going back to the basics, identifying timeless and quality designs and accounts for circularity. Every decision made at the design level affects the lifecycle of the garment considering the silhouette, fabrication, structure, construction.

All the elements that go into the design of a garment determine how long it will live, how long it can be worn, when it can be worn, and who can wear it. Sustainable development is defined by Brundtland Report as "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs" (Brundtland, 1987). Designing for circularity promotes sustainability by generating a longer life for a garment beyond its wearable life (Piller, 2022). To achieve sustainable development, practices such as Cradle-to-cradle Apparel Design, or C2CAD, are implemented to promote circular design practices that prevent garments from becoming waste in a landfill. Circular cycles are the key to

sustainable design – seen in every natural cycle as it moves circular with birth, decay, and rebirth (e.g. water cycle, nitrogen cycle, carbon cycle) (McDonough and Braungart. 2010). To preserve our natural resources and prevent harm and destruction to the natural environment, we must operate like the environment using circular cycles that return what we take from the earth to prevent loss of any resources.

The apparel industry is consumer driven and therefore the industry and consumers should be concerned with the planet they occupy. However, the apparel industry is accountable for 92 million tons of textile waste each year (Igini, 2022). Sustainable design practices, such as C2CAD, ability to meet present needs without compromising the ability of future generations to meet their needs lies in the Triple Bottom Line, or TBL, principals. The TBL outlines three key elements of performance: social, environmental, and financial (Slapper and Hall, 2011). These are also commonly referred to as the 3 P's for people, planet, profit. People refers to the social element of sustainability that is the well-being of people and the community, planet refers to the environmental element that emphasizes long-term viability of resource use and emphasizes the issue of environmental degradation and resource depletion, and profit refers to the economic element that emphasizes a dynamic, long-lasting economy, while recognizing the importance of providing secure, long-term, ethical employment (Park and Kim, 2016).

The industry must adopt cradle-to-cradle apparel design methods and abandon the current "sacrificing resources and environment to make money" mindset (Zhi, 2021, para. 3). Cradle to cradle apparel design, or C2CAD, is a sustainable apparel design and production model, developed in 2008, that provides guidelines for apparel designers and manufacturers to solve problems related to apparel production (Gam et al., 2009). It addresses some of the fundamental

flaws of apparel design and manufacturing that damage the environment, produce cheap apparel, and operates using the cradle-to-grave model.

## Purpose of the Study

The purpose of this study was to explore the design process of a New York based luxury fashion company, MONO for anonymity, and the methods for cradle-to-cradle apparel design that results in high quality pieces that are made to last, be worn, and recycled. This research explores the core values, research methods, design process, and production model of MONO, to discover sustainable approaches to apparel design. The findings serve as support for the Cradle-to-Cradle apparel design research to further develop a sustainable model for apparel design and production. Below are the research objectives of this study.

- To explore how a case study luxury fashion company incorporates minimalism and eco-design into their design process and production of apparel.
- To understand the design challenges of utilizing sustainable design approaches in the fashion industry.

## Significance of the Study

The aim of this study is to analyze the design process and production methods of a New York luxury fashion company that practices sustainable design and development that can inform other brands as well as identifying any areas for improvement and change. This study's findings are significant because there are many aspects and moving parts to apparel design, so developing a sustainable approach can be done in a variety of ways. The significance was found within the case study, MONO, and their intentional practices, connectedness, and relationships with every

person that becomes a part of the ecosystem that they have built centered around their core values. Their core values allow them to navigate a dynamic, evolving, complex system that is the fashion industry, to conceive, design, develop, and create intentional pieces that are high-quality, timeless, durable, and functional. These pieces are made to foster connections between the garment and the wearer, this connection promotes longevity for the pieces as well as their intentional strategies that prolong the life of every piece. MONO navigates the fashion industry and builds an ecosystem that is structured around semiotics by developing meanings and creating a purpose throughout every step of their intentional process. This research serves as just one of the many ways to develop a sustainable design and production process.

# CHAPTER 2

# LITERATURE REVIEW

Chapter 2 contains the following sections: (a) cradle-to-cradle, (b) systems for C2CAD: eco design, (c) systems for C2CAD: applied minimalist principles, (e) theoretical framework and (f) research gap and questions.

## Cradle-to-cradle

The concept of cradle-to-cradle (C2C), developed by McDonough and Braungart (2003), laid out the framework for "remaking the way we make things" urging companies to consider eco-effectiveness to find ways to utilize waste to produce other products. According to McDonough and Braungart (2003) "Unlike cradle-to-grave systems, cradle-to-cradle design sees human systems as nutrient cycles in which every material can support life" (McDonough and Braungart, 2003, p. 13, para. 1). The cradle-to-cradle method serves to address the design and production methods that enable this disposable, one-way, cradle-to-grave system much of the apparel industry operates on. Cradle-to-cradle model is an environmentally conscious evolution of cradle-to-grave, that focuses on design and product development that creates innovative, high-quality products that generate economic value while enhancing the well-being of nature and culture (Hethorn & Ulasewicz, 2015).

According to Haggar (2010), design that utilizes the cradle-to-cradle concept creates a product lifecycle operates on a closed loop, that without losing any natural resources, utilizes materials that can be reused, where no waste is produced or waste produced is recycled, and there are no negative impacts on the environment.

Gam and colleagues (2009) utilized McDonough and Braungart's "cradle to cradle" model, integrating it into existing design and production models, to develop the C2CAD model. According to Gam and colleagues, the C2CAD model is the first apparel design and production model that emphasizes sustainability in addition to functional, expressive, and aesthetic considerations (Gam et al., 2009).

Companies can now become Cradle to Cradle Certified® by showing their commitment to providing products that are "safe, circular and equitable continues to grow in the fashion industry, with brands placing focus and taking action on circularity, clean energy and social fairness" (C2CCertified, 2022, para. 1). This certification can be reached a few ways, as seen by several companies' sustainable efforts such as utilizing biodegradable leather, producing 100% recyclable apparel, implementing take-back programs, producing using 100% organic textiles, implementing strategies to produce using less water during dying processes, and using technical fabrics made from organically grown plants. Bananatex® is an example of a technical fabric that is "made purely from the naturally grown Abacá banana plants… within a natural ecosystem of sustainable mixed agriculture and forestry, the plant is self-sufficient, requires no pesticides, fertilizer or extra water" (C2CCertified, 2022, para. 6).

**Reviewing C2C Literature**

McDonough and Braungart (2002) cradle-to-cradle is a sustainable design philosophy that was intended to be implemented to combat the cradle-to-grave approach where waste is disposed in a landfill to cradle-to-cradle where waste is used to produce other products (McDonough and Braungart, 2002). Cradle-to-cradle approaches sustainability from a design

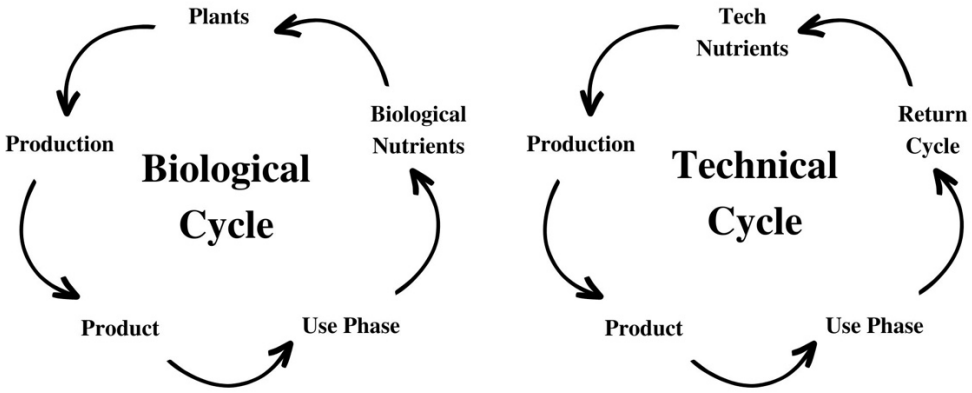
perspective, that demonstrates the need for a shift in the current fundamental design systems. According to McDonough and Braungart's cradle-to-cradle theory,

> "Unlike cradle-to-grave systems, cradle-to-cradle design sees human systems as nutrient cycles in which every material can support life. Materials designed as biological nutrients provide nourishment for nature after use; technical nutrients circulate through industrial systems in closed-loop cycles of production, recovery and remanufacture" (McDonough and Braungart, 2003, p. 13, para. 1).

To design for material circularity, designers must carefully consider how the material components will be effectively used, reused, and regenerated in circular systems (McDonough and Braungart, 2003). This requires an understanding of the chosen materials fibers to understand the materials cycle in a conscious effort to eliminate waste and the need for virgin resources (Circular.Fashion, 2018). To effectively achieve this, one must consider the materials ability to be recycled in the tech-cycle or biological cycle shown in figure 2. The biological cycle refers to organic materials that can degrade or compost in natural or controlled environments in a limited time and the technical cycle refers to materials that have potential to be either mechanically or chemically recycled and regenerated into technical nutrients for new fibers (Circular.Fashion, 2018).

**Figure 2.1**

*Biological Cycle and Technical Cycle*




*Note*. Figure adapted from Circular.Fashion, 2018.

Through implementing cradle-to-cradle design methods, the lifecycle of the product is in the hands of the designer as they choose materials, or biological nutrients, for the design and production that serves as a nutrient after its first useful life. Outlined in the tenants of cradle to cradle and principles of green engineering outlined below, designers can implement C2CAD for sustainable apparel design and production by considering sustainable features when making decisions during the design process addressing the three pillars of sustainability (people, planet, profit).

There are three tenants of cradle-to-cradle design – tenant one: waste equals food; tenant two: use current solar income; tenant three: celebrate diversity (McDonough et al., 2003, p. 436). Each tenant of cradle-to-cradle design is further described below:

***Waste equals food***

Since the beginning of time, the natural process of the earth and its organisms has operated on a closed loop: one organism's waste is food for another. Nutrients flow in cycles of birth, decay, and rebirth seen by every natural cycle. Hence, waste equals food. Understanding

natures regenerative systems creates a way for designers to recognize and utilize materials and designs that can serve as nutrients that flow through natural or designed metabolisms. Natures cycles comprise of the natural, biological metabolism and the technical, or designed, metabolism is intended to mirror natures cycle. Technical designs operate on a closed-loop where benign, valuable, high-tech synthetics and mineral resources circulate in the cycle of production, use, recovery, and remanufacture (McDonough et al., 2003, p. 436). For an applied understanding of this tenant, McDonough and colleagues (2003) describes:

> Within this framework, designers and engineers can use the principles of green engineering to create and select safe materials (Principle 1) and optimize products, processes, and services in designing closed loop material flows (Principle 10) that are inherently benign and sustainable. Materials designed as biological nutrients, such as textiles and packaging made from natural fibers, can biodegrade safely and restore depleted soil nutrients. Materials designed as technical nutrients, such as carpet yarns made from synthetics that can be repeatedly depolymerized and repolymerized, are providing high-quality, high-tech ingredients for generation after generation of synthetic products. To achieve these types of improvements, engineers must integrate the parameters of material and energy flows (Principle 10), durability (Principle 7), and disassembly (Principle 3) into all aspects of their design (McDonough et al., 2003, p. 436, para. 5).

### *Use current solar income*

Just as trees and plants use sunlight to manufacture food, cradle-to-cradle emphasizes that our systems can be just as effective by tapping into the same source: sunlight. Cradle-to-cradle research proposes designers to collect solar energy for light sources and capturing wind power or thermal flows fueled by sunlight (McDonough et al., 2003). Both processes could be considered when sourcing materials as well, considering the suppliers use of solar and wind power. They suggest that by using the principles of green engineering, designers can ensure that both energy and material inputs are renewable rather than depleting (Principle 12).

### *Celebrate diversity*

Nature provides designers with a variety of models to imitate in the design process to promote sustainability and implement cradle-to-cradle design philosophy. When celebrating diversity, designers tailor their designs to appeal to a particular niche where positive effects will be implemented. According to McDonough and colleagues, "optimal sustainable design solutions draw information from and ultimately "fit" within local natural systems" (McDonough et al., 2003, p. 437, para. 1). Designers must understand such local relationships in order to enhance the natural process, integration, and interconnectivity (Principle 10). Instead of a one-size-fits-all or inclusive design, a designer should acknowledge differences and diversity to design more effective and engaging designs for a specific locality. As their research explains, "When a process is designed for a specific locality, materials and energy are expended as needed; this approach is better than building for the worst-case scenario, which would require materials and energy that may never be needed" (McDonough et al., 2003, p. 437, para. 2).

**Table 2.1**

*The 12 Principles of Green Engineering*

| | |
|---|---|
| Principle 1 | Designers need to strive to ensure that all material and energy inputs and outputs are as inherently **nonhazardous** as possible. |
| Principle 2 | It is better to **prevent waste** than to treat or clean up waste after it is formed. |
| Principle 3 | Separation and purification operations should be designed to **minimize energy consumption and materials use**. |
| Principle 4 | Products, processes, and systems should be designed to **maximize** mass, energy, space, and time **efficiency**. |
| Principle 5 | Products, processes, and systems should be "**output pulled**" rather than "input pushed" through the use of energy and materials. |
| Principle 6 | Embedded entropy and complexity must be viewed as an **investment** when making design choices on recycle, reuse, or beneficial disposition. |
| Principle 7 | Targeted **durability**, not immortality, should be a design goal. |
| Principle 8 | Design for **unnecessary capacity or capability** (e.g., "one size fits all") solutions should be **considered a design flaw**. |
| Principle 9 | **Material diversity in multicomponent** products should be **minimized to promote disassembly and value retention**. |
| Principle 10 | Design of products, processes, and systems must include **integration and interconnectivity** with available energy and materials flows. |
| Principle 11 | Products, processes, and systems should be designed for **performance in a commercial "afterlife"**. |
| Principle 12 | Material and energy inputs should be **renewable** rather than depleting. |

*Note*. Table adapted from McDonough and colleagues (2003).

According to cradle-to-cradle research by Haggar (2010), design that utilizes the cradle-to-cradle concept creates a product lifecycle operates on a closed loop, that without losing any natural resources, utilizes materials that can be reused, where no waste is produced or waste

produced is recycled, and there are no negative impacts on the environment. Haggar (2010) describes their framework as:

> The cradle-to-cradle concept promotes sustainable development. It is a system of thinking based on the belief that human endeavors can emulate nature's elegant system of safe and regenerative productivity, by transforming industries to sustainable enterprises and eliminating the concept of waste (Haggar, 2010, p. 18, para. 3).

Haggar describes how cradle-to-cradle principles create a cyclical flow of materials and resembles the nutrients that flow cyclically in natural ecosystems. This process, Haggar explains, is a design process that will save the environment from waste and other negative impacts as well as benefits the industry by providing continuous available products and high value materials past the initial useful life (Haggar, 2010). Haggar outlines the elements of cleaner production (CP) and how at its core its aim is prevention rather than clean up.

According to Haggar, when implemented on a smaller scale, "cleaner production will reduce operating costs, improve profitability and worker safety, and reduce the environmental impact of a business" (Haggar, 2010, p. 23, para. 6). On a broader scale, cleaner production can help minimize and reduce more serious problems of air and water pollution, global warming, land degradation, solid and liquid wastes, and many more environmental crises (Haggar, 2010).

Cleaner production is described as a preventative approach, encompassing eco-efficiency, and pollution prevention methods that does not discourage economic growth, rather insists that growth is sustainable (Haggar, 2010). Cleaner production methods aim to rethink products, processes, and services that move towards sustainable production. Haggar's research outlines the steps to cleaner production including source reduction (i.e. good housekeeping, process

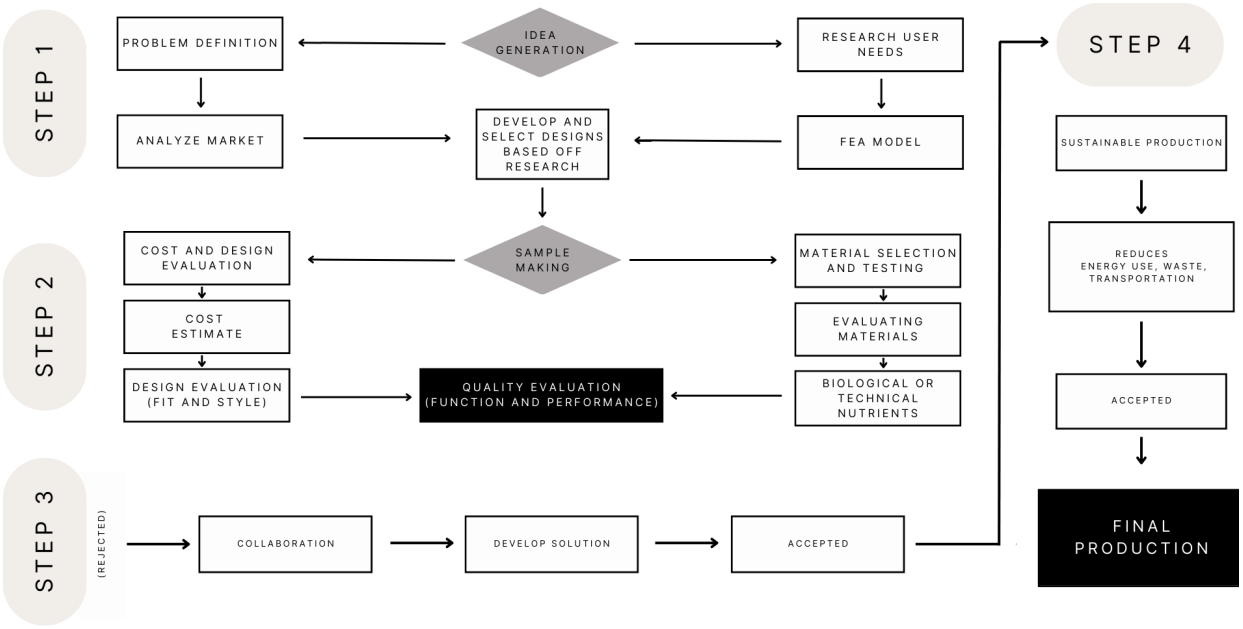
changes), recycling (i.e. on-site recycling, useful byproducts through off-site recycling), and product modification (Haggar, 2010, p. 25, figure 2.1).

According to research by Gam and colleagues (2009), the C2CAD model is the first apparel design and production model that emphasizes sustainability in addition to functional, expressive, and aesthetic considerations (Gam et al., 2009). Gam and colleagues (2009) established the framework for C2CAD beginning with the "cradle-to-cradle" model established by McDonough and Braungart (2002). Their research integrated the cradle-to-cradle model with existing apparel design and production models to develop a sustainable design and production model, C2CAD. Their research explains that C2CAD has four main steps:

1. Problem definition and research
2. Sample making.
3. Solution development and collaboration.
4. Production.

**Figure 2.2**

*The C2CAD design and production process.*




*Note*. Adapted from Gam, H. J., Cao, H., Farr, C., & Heine, L. (2009).

Illustrated in figure 2.2, Gam and colleagues (2009) map four steps to achieve cradle-to-cradle apparel design for sustainable design and production. According to their research, step one of C2CAD is problem definition and research according to the functional, expressive, and aesthetic perspectives outlined by Lamb and Kallal (1992) research on the FEA model. This means designers must define problems and analyze the market from both the industry and the consumers point of view. Assessing the consumers options, finding out what they are looking for, and how to give them more than just what they are looking for. Fast fashion offers cheap, short-term solutions to consumers wants and needs, slow fashion offers quality, long-term solutions to consumers wants and needs, often exceeding initial expectations.

Step two of C2CAD is sample making, which includes “material selection and testing” and “cost and design evaluation” (Gam et al., 2009, p. 169, para. 2). Step two aids in establishing a tangible design, which determines if the product will be marketable and producible (Gam et al., 2009). Sample making will let companies evaluate the designs, selecting materials that align with C2C research by McDonough and Braungart (2002) to select biological or chemical nutrients, before investing money and time in production costs and labor. Through material selection and testing, designers receive samples of potential materials to be used for production, and eliminate those less favorable, based on materials feasibility as biological or technical nutrients. Here, designers must also consider chemical ingredients based on cradle-to-cradle chemical assessment protocol. According to Gam and colleagues (2009) and based on figure 2.2, “Designers will phase out “red” materials and use more “green” materials” (Gam et al., 2009, p. 169, para. 2). They further explain that as materials are either biological or technical nutrients – meaning biological are disposed without negative environmental impact and technical must have a plan for reuse or recycling after the products end of wearable life (Gam et al., 2009). If a material is a mix of biological and technical nutrients, they explain that separation processes are determined for the nutrients to follow separate pathways for disposing, reuse, or recycle (Gam et al., 2009. McDonough and Braungart, 2002). They further explain the second element of step two, cost and design evaluation, in which apparel designers and production teams must evaluate function, performance, fit, style, and estimate cost. It is here that if the sample does not meet the requirements for these criteria, the design must be modified and re-evaluated for future development (Gam et. al., 2009).

Step three of C2CAD is solution development and collaboration, which encourages an integrated design and production approach to apparel design, development, and production. Gam

and colleagues (2009) research explains “In the “cradle to cradle” model, Braungart (2002) proposed “intelligent materials pooling,” which emphasizes collaborative approaches, such as sharing knowledge and resources, as important strategies in sustainable development” (Gam et al., 2009, p. 170, para. 1). Most apparel companies do not produce the textile fabrics, dyes, and other materials for apparel design and production. These companies collaborate with other companies in the supply chain to source materials for their designs and production. Here, designers must source sustainable materials by working with companies to phase out any “red” material.

Their research further explains that designers must select materials and treatments based on their inherent human and environmental safety. These choices will improve the employee’s safety while also protecting and improving the living quality of the local community. Selecting materials based on human and environmental safety is a major factor, as well as selecting materials that are designed to cycle safely at the end of a products’ wearable life. According to Gam and colleagues (2009), the short-term cost of material research will save us in the long term by preventing harmful air, water, and solid waste release from manufacturers, thus saving money for the local communities in pollution prevention and treatment.

> C2CAD model emphasizes the importance of industrial collaboration and knowledge sharing (step 3 of C2CAD). So, this short-term cost in material research will eventually turn out to be a long-term saving in many aspects such as pollution treatment and material cost. (Gam et al., 2009, p. 177, para. 1).

The final step of C2CAD outlined by Gam and colleagues (2009) is production, and unlike other production models, C2CAD considers sustainability. The considerations of sustainability for production outlined by their research include energy use, air emissions, water,

and solid waste (Gam et. al., 2009). These may be accomplished by collaborating with other industries to collude with companies that "produce renewable energy or use solid waste from apparel production as their biological nutrients or raw materials, are needed to reduce or eliminate harmful impacts during production" (Gam et al., 2009, p. 170, para. 2). Sustainability for production might also look like reshoring, traditional two season production runs, and smaller batches.

### *Eco-Design and Minimalist Led Approaches to C2C*

Eco-design and minimalism are two systems used to analyze the steps to implementing C2CAD in this research. By analyzing the eco-design and minimalist qualities, this research will use these two strategies to discover eco-design and minimalist led approaches to sustainability barriers present during the design phase. Prendeville and colleagues (2011) research explores the values, barriers, and incentives of three eco-analysis tools, including C2C. According to Prendeville and colleagues, the cradle-to-cradle framework "rebuffs current eco-efficient, reductionist paradigms, where dematerialization, light weighting, and design for disassembly are central principles" (Prendeville et al., 2011, p. 3, para. 3). The basis of C2C framework puts emphasis on the evaluation of materials based on toxicity, energy use (solar), reuse and recycling methods with water usage and social responsibility playing a role (Prendeville et al., 2011). Prendeville and colleagues research found that "The real significance lies in the *philosophy* and way of thinking that has been imparted from going through the C2C process" (Prendeville et al., 2011, p. 3, para. 5). This significance in the way of thinking becomes profound at the design stages through an eco-design led approach, that allows designers discover new, innovative ways to implement C2C practices by utilizing eco-design tools that require varying levels of expertise such as eco-matrices, checklists, and spider diagrams (Prendeville et al., 2011, p. 3, para. 5).

According to Cimatti and colleagues (2017) research surrounding eco-design and sustainable manufacturing in fashion:

> "The traditional 3R concept promoting green manufacturing technologies (Reduce, Reuse and Recycle) has been surpassed by the more recent 6R concept forming the basis for sustainable manufacturing (Reduce, Reuse, Recover, Redesign, Remanufacture, Recycle)" **(**Cimatti et al., 2017, p. 397, para. 3).

Their research outlines the role eco-design plays within sustainable design, product development, and production practices that allows for the transformation from an "open-loop, single life-cycle" paradigm to a "closed-loop, multiple life-cycle paradigm" (Cimatti et al., 2017, p. 397, para. 3). These qualities that eco-design promotes within design, product development, and production directly aligns with C2C practices, by closing the loop and creating multiple lives for products beginning with the beginning phases of the design phases (McDonough and Braungart, 2002). Their research also indicates eco-design may be achieved through durable designs, pointing out that "Durability enjoys an easy relationship with sustainability, depending on the choice of materials" (Cimatti et al., 2017, p. 394, para. 7).

According to Byggeth and Hochschorner's (2006) research, the eco-design checklist "helps to identify the main environmental problems along a product's life cycle. The user has to evaluate whether the solutions in the checklist are good, indifferent, bad or irrelevant" (Byggeth & Hochschorner, 2006, p. 1425, Table 1).Byggeth and Hochschorner's (2006) research outlines several tools that may be used at different phases of the design and product development phases as well as the procurement phases of production. Tools such as eco-design checklists are intended to be utilized in the early in the design process and promotes a life cycle perspective for the design, which aligns C2C process by accounting for the entire lifecycle of the design

(McDonough and Braungart, 2002). Utilizing the eco-design checklist allows designers to research eco-materials and create a constantly evolving and rotating reference list of materials and strategies to utilize during the design process to account for environmental properties that promote C2C designs such as recycled, regenerated, or biodegradable materials (Byggeth & Hochschorner, 2006). Other eco-design tools intended to be used in later phases, for comparing alternatives, such as the econcept spiderweb, are intended for later stages of the design process as there are several concepts are being compared (Byggeth & Hochschorner, 2006). According to Byggeth and Hochschorner's (2006) research, the econcept spiderweb "can be used for an estimation to decide between design alternatives. The user defines an appropriate set of criteria to be used for the estimation. For each solution a qualitative evaluation of the criteria is made and gives an environmental profile for each solution" (Byggeth & Hochschorner, 2006, p. 1426, Table 1 (continued)). Although this one does not have a life cycle perspective, it does create a resource that contains materials with solutions for creative designs with a life cycle perspective that utilize eco-design specific materials to create design solutions that better promote C2C outcomes (Byggeth & Hochschorner, 2006).

Where minimalist attributes become inherently critical to achieving C2C, is by utilizing eco-design strategies with minimalist principles, which allows for more accessible and easily identifiable process, as parts and processes are minimized to create better clarity and focus. This clarity and focus attributes to C2C as designers, product developers, producers, and manufacturers may be more capable to identify risks within the design, processes, and production that may be critical to the C2C components success. Byggeth & Hochschorner's research explains that:

> "a sustainability aspect is not enough, as unintended suboptimization might occur if the whole life cycle of the product is not covered in the Ecodesign tool. The entire system might not be considered and therefore, there is a risk that only a small part, even an insignificant part, of the system will be improved." (Byggeth & Hochschorner, 2006, p. 1429, para. 4).

Therefore, it is crucial to minimize design, product development, and production processes to create a clear, focused process where risks may be identified, eco-design and minimalist tools utilized, and solutions found to accomplish C2C outcomes. Minimalism creates better focus through utilizing limited material to create a desired affect which directly correlates with eco-design elements outlined by Na and colleagues (2011) and C2CAD principles (Cedric, 2011). Minimalist design practices offer a more clear, focused space for imagination and reduces excess noise in our minds by utilizing fewer elements – getting rid of the excess noise allows for greater focus on the essence which allows for freedom of interpretation (Cedric, 2011). Removal of the excess noise, grants designers, product developers, and producers' greater freedom to interpret the designs and alternatives and the ability to focus on the eco-attributes of the design, materials, and processes that better promote a C2C lifecycle for the garment (Cedric, 2011). Similar to eco-design, minimalism supports C2C efforts by adapting a more simplistic design and production approach that reduces the number of resources exhausted in design and production (Cedric, 2011). This can be achieved by utilizing several design and production strategies, which, when looked at through a minimalist perspective, by stripping down the layers that can be distracting or harmful to the environment, will better support eco-design practices and achieve C2C lifecycles when combined, by stripping down the layers that can be distracting or harmful to the environment.

## Systems for C2CAD: Eco-Design

According to the European Commission, "It is estimated that over 80% of all product-related environmental impacts are determined during the design phase of a product" (European Commission, n.d., para. 6). This means that it is imperative for designers to consider the lasting effects of their creation on the environment and not just the consumer. In addition, designing a product following eco-design principles will mean designing a product that is made to last and promotes a circular economy, which in turn will make a product that pleases the consumer. Eco-design, a sustainable design approach, considers the environmental impact of the product during its whole lifecycle, which includes four phases: procurement, manufacture, use, and disposal which plays a crucial role in moving towards a circular economy (Cimatti et al., 2017). The Ellen McArthur foundation lays out three key principles to a circular economy that is driven by design as "eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature" (Ellen McArthur Foundation, n.d.). Understanding a circular economy is critical to practicing eco-design by minimizing or eliminating waste, utilizing high quality recycled or restored materials, and designing for the end of the product's wearable life.

Cimatti and colleagues (2017) research tells us that eco-design can be applied to fashion design by choosing sustainable materials instead of synthetics or choosing to forego damaging chemical substances and processes and use natural alternatives. According to Lee (2017), "In the eco-design approach, all possible factors (e.g., ergonomic, environmental, aesthetic, and cost) that might influence the environment are considered to minimize hazardous environmental effects throughout the products' life cycle" (Lee, 2017, p. 22, para. 2).

Pal (2017) explains that eco-design aims to improve energy efficiency and resource effectiveness by implementing design strategies such as dematerialization and multi-

functionality, which is further explained later in thesis research. Taking consideration for sustainable materials is one aspect of eco-design, but also consumer needs. The FEA consumer needs model emphasizes functional, expressive, and aesthetic perspectives (Lamb and Kalkal, 1992). With these taken into consideration, a designer may prolong the life of a garment for the consumer.

According to Wang and Shen (2017), implementing an eco-design approach to design and development is critical to developing sustainable fashion practices. Wang and Shen (2017) define eco-design as "a variety of design aspects that relate to a products environmental impact" (Wang and Shen, 2017, para. 2). This means that, by practicing eco-design, the design and production of sustainable apparel can rely heavily on the supply chains and significantly influence the entire supply chains process at the design and development stages by selecting eco-materials, process design, production, and distribution (Wang and Shen, 2017). Wang and Shen also explain that it is not only critical to eliminate harmful environmental impacts in supply chain operations but to also to optimize raw-material selection by considering both green and aesthetic principles, thus satisfying aesthetic demands while also integrating Tipple Bottom Line elements into the design process (Wang and Shen, 2017).

According to Pal (2017) "eco-design principles include not only the choice of the material but also the functionality of the product throughout the life cycle (effecting the environment in terms of water and energy consumption)" (Pal, 2017, para. 10). The life cycle of a garment is usually linear, from production to consumption to the garbage. However, with strategic and intentional design choices, the life of a garment can be cyclical. By designing with FEA considerations in mind, a designer can create pieces made for life. Cui and colleagues (2021) research better defines the FEA model:

> Functional needs consider utility, i.e. how the wearable product meets consumers' needs to perform specific tasks. Expressive needs concern communicative and symbolic aspects of wearable products. In other words, the wearable product should match consumers' status and self-image. Aesthetic needs relate to the design and beauty of the wearable products (Cui et al., 2021, para. 8).

Considering the functionality of the product throughout the life cycle (Pal, 2017) in terms of water and energy consumption and the FEA model (Lamb and Kallal, 1992), eco-design is a crucial step towards a more sustainable design process that utilizes fewer resources and produces apparel with consumers needs in mind to create a more comfortable, functional, and aesthetic experience with minimal environmental impact.

Eco-design choices are crucial at the beginning stages of the design process. With increased consideration from the start of the design process, including conceptual design ideas, material selection, and color choices, designers can minimize environmental impact later. The bottom line for eco-design is designing apparel with both the environment and the consumer in mind to prolong the life of a garment and considers its life after its end use.

**Conceptual Design Choices**

Conceptual design plays an enormous role in the lifecycle of a garment. Conceptual design choices, from an eco-design perspective, can range from practicing slow fashion and producing two cycles a year (Spring/Summer and Autumn/Winter) versus fast fashion producing up to 50 cycles a year (Figure 1.1).

Comfort is of the utmost importance when it comes to the conceptual design of a garment. Comfort will determine the amount of wear and the longevity of the piece, so designing

a multifunctional piece must account for comfort in terms of ease of use, fit, and aesthetics. Cunha and Broega (2009) explain that "Ergonomic comfort is related to the body movement comfort, the ability of a garment to allow freedom of movements, has to do with body shaping, clothing patterns making and sewing" (Cunha and Broega, 2009, p. 864, para. 1). Ergonomic comfort will allow for a garment to be easily worn and transformed by the user in a variety of scenarios.

Conceptual design practices such as multifunctionality and dematerialization is critical to designing for sustainability. According to Cunha and Broega (2009), multifunctional apparel can be defined as "clothing or clothing systems that allow different uses in different scenarios, such as adaptation (dynamic or not) to diverse social situations or weather conditions, or just clothing that has different characteristics in different body areas in order to have different functional features, such as different permeability characteristics and different flexural properties in specific areas of the garment, among others" (Cunha and Broega, 2009, p. 863, para. 3).

One aspect of designing with multifunctional principles in mind, is that the designer must consider design elements that make garments transitional, easily worn year round in a variety of social situations. This might mean a garment that is an underpinning, made to be layered with other pieces or a stand-alone garment that has components that allow the user to transform it in different scenarios. Designers must also account for an underpinning that is often a stand-alone garment depending on weather conditions, so the fabric must not be too thick or thin for optimal comfort. When designing a stand-alone garment that has components that allow for the user to transform the garment, the designer must also consider the ease of use and types of use for optimal comfort. Transition should not be too difficult and should account for some different form of comfort when transitioning – think functional, expressive, or aesthetic when designing

multifunctional pieces. This could be a transition that is more comfortable for a professional environment but can be transformed for a social scene or one that is more comfortable when transitioned for cold and windy environments. For example, designing pants with buttons as the side seam allows the user to transform the garment to suit both of those scenarios, buttoned up for comfort in a professional or cold environment, and unbuttoned or repositioned buttons for social or warmer environments. Multifunctional garments may also include reversible garments that create a different look for the user, creating more ways to wear the piece and thus prolonging the life of the garment and adding value for the consumer.

Multifunctionality is a sum of many components when it comes to design and construction. A study conducted by Na, Kim, and Lee, (2011), on multifunctional characteristics in terms of types and methods of expression found that the characteristics of a multifunctional eco-friendly design included:

> First, the characteristics of multifunctional eco-friendly fashion design used squared silhouette, achromatic colors, plain patterns for pollution control, hard materials to prolong the product, it was clear that details were minimized to save resources.
>
> Second, there were 5 changeable types of multifunctional eco-friendly fashion design which were changes in changing forms, material changes, item changes, detail changes and complex changes.
>
> Third, as the result of changeable types by method of expression, the changing forms were expressed by removable, material changes by reversible, detail changes by open and close and item changes by shifting.
>
> Forth, the formative properties of multifunctional eco-friendly fashion design had flexibility, multifunction, versatility and amusing (Na et al., 2011, p. 119, para. 1).

All the characteristics and features outlined by Na and colleagues (2011) research points to the characteristics of eco-design and minimalism from a design and production level outlined in this research. Multifunctionality relies heavily on a silhouette that is versatile, and as displayed through minimalist characteristic, utilizing sharp lines, and clear, easy to read shapes can help to achieve a versatile design that is easily adapted to changing environments and scenarios (Cunha and Broega, 2009). The success of the adaption can rely heavily on the color choices, following minimalist perspectives by utilizing monochromatic achromatic, and plain patterns, which also align with eco-design principles as this reduces steps and pollution, further explained later. Changeable forms, utilizing removable parts, reversible material, and detail changes are all successful design choices that follow eco-design and minimalist characteristics that result in a garment that is more easily deconstructed for different styles, comfort, repairs, and ultimately recycling.

**Sustainable Materials and Manufacturing Processes**

The key criteria to consider when selecting sustainable materials are the origins, processes, and what happens at the end of a products life (Johnston, 2012). One of the first elements to consider is if the source of the fiber is easily renewable and if the fiber was recycled or can be recycled past the original lifecycle. According to Johnston, designers should also consider if the use of water and land is appropriate for the quantity and cost of natural fibers produced and for manufactured fibers consider if the raw material for production is easily available and renewable for manufactured fibers produced and if fibers are produced using nonpolluting methods (Johnston, 2012). They must also consider how fibers are produced regarding waste and the use of nontoxic substances in the air, land, and water.

The origins are crucial to a sustainably made garment and will be a key determinant in the longevity of the garment. Many companies are striving to produce more sustainably and ethically using recycled and other alternative materials for apparel. According to Lee (2017), research has shown that one of the most popular natural materials used in the apparel industry today are cellulosic fibers, including cotton, flax, hemp, mulberry, and ramie (Lee, 2017). These fibers have shown that they have both the capability to satisfy environmental standards for recycling through the biological cycle (figure 2) and provide greater technical performance properties, compared to synthetic alternatives, such as ventilation, moisture absorption, and natural cooling as well as superior properties such as antimicrobial and wicking capabilities (Lee, 2017).

Selecting natural materials such as cellulosic fibers during the design stages is essential to eco-design as it considers the afterlife of the garment in terms of recycling and biodegradability but that's not all. The consumer must be aware of how to care for the garment to prolong the life and the properties of the garment that allow for recycling. This is where production and manufacturing come in to ensure that the hangtags have proper labeling that outline the materials, care, and garment construction as well as the fabric tags that also indicate proper care for a longer life.

A few examples of sustainable, eco-design materials would be recycled materials, biodegradable materials, sustainably sourced leathers (real or vegan), deadstock, and many more. Sustainable fabrics listed below are described by Pandey and colleagues (2020) as some of the most common natural fibers:

*Cellulosic fibers*: Organic plant fibers are environment friendly with considerably smaller ecological footprints than that of other fibers. This group consists of large number of

diverse fibers known for their distinctive characteristics. Cellulose content, physical properties, and extraction procedure of lignocellulosic fibers determine their surface morphology and application for various purposes.

*Protein fibers*: Protein fibers derived from animal hairs and insects are one of the wonderful resources produced by caring farmers. Silkworms are not killed during manufacturing of peace silk. Mélange spun silk developed from the silk production processing waste is utilized for various diversified applications.

*Mineral fibers*: Naturally occurring mineral fiber asbestos is valued for its flame retardancy and used for curtain and furnishings in industries where inflammable materials are handled or manufactured.

*Regenerated fibers*: Fibers under this class are sourced from plant cellulose, grains, and milk protein.

*Recycled fibers*: Recycled fibers are one of the most emerging classes of fibers utilizing the used textiles and plastic bottles. Recycling prevents the huge quantity of used textiles and plastic bottles from being discarded into landfill. Around 70 million barrels of oil is used every year to produce polyester fiber, causing water pollution and CO2 emissions. Therefore, recycling of used polyester fabrics and plastic bottles is more preferable option to manufacturing new petroleum-based fibers. (Pandey et al., 2020, p. 3.2.1)

These materials should also be selected based on the physical longevity of the materials considering many wears and washes. Sustainable materials, when selected carefully, are durable and promote physical longevity for a garment. Durability goes hand in hand with sustainability as when designers create garments using resilient materials, it gives the piece potential to

lengthen its wearable life (Fletcher, 2012). However, longevity depends less on the fabric and more on the entire piece, because "a garment will last only as long as its least durable component" (Fletcher 2012, p. 226, para. 2). According to Harper (2017), "Durability" is central to the notion of sustainability and to the development of sustainable design objects and concepts:

- Durability is associated with the use of sustainable, *enduring materials*, or materials that *age gracefully*.
- Durability, as a concept, can refer to materials that make it *easy to repair or to upcycle* design objects.
- Durability is often connected with design solutions that can be *updated continuously* by means of *technology or replaceable elements* that safeguard against their *obsolescence*.
- Durability, finally, can refer to *functionality and flexibility* (Harper, 2017, p. 4, para. 1).

All the durability concepts outlined by Harper (2017) directly correlate with the nature of this research for both eco-design and minimalism in relation to C2CAD. Eco-design emphasizes the importance of sustainable sourced materials that can forego the biological or technical cycle required for C2CAD. Eco-design and minimalism also emphasize the importance of multifunctionality which in turn relates to the durability of the design, allowing for easy repairs, updates, to create a functional and flexible garment as outlined by Harper (2017). In addition to the criteria mentioned above by Harper (2017) for durability, design and construction strategies that promote durability and longevity aims to balance the lifespan of a piece, building a shared or similar longevity of a seam, fabric, fastening, facing, etc. (Fletcher, 2012). According to Fletcher (2012) this approach allows for "workmanship to be as durable as the hardworking fabric on a garment's cuffs, hems, and knees. It matches a fabric with poor dimensional stability or wash fastness with low-grade seam construction" (Fletcher, 2012, p. 226, para. 2). Therefore, design,

production, and manufacturing should take an integrated approach, following C2C guidelines, to allow for the physical longevity of garments by designing an all-around, shared durable design for each part of the piece. Accounting for a shared durable design can be addressed during the pattern making process, further discussed later, by identifying stress points in the garment, such as the crotch or elbow, to then make decisions regarding the seam allowance or stitch to increase the garments durability. Additionally, during the pattern making process, designers can reduce waste or aim for zero-waste by using strategies such as the jigsaw puzzle, discussed more later (Kazlacheva, 2021).

*Alternative Fabrics*

Fabrics made from textile waste, primarily from natural cellulosic fibers such as cotton, are becoming more popular to recycle and make new fabrics like Circulose and NuCycl. These fabrics are derived from pre- or post-consumer textile waste such as production scraps and worn-out jeans, which in turn reduce waste and results in lower carbon emissions (Nizzoli, 2022). This process promotes circular production from a fabric selection standpoint as it aims to reduce waste and prolong the lifecycle of a garment beyond its original wearable life.

Other companies are advancing technology to find new ways to prolong the life of a fabric or give life to an old fabric. Kintra is a company that produces proprietary polymer that performs like traditional technical yarns but degrades like natural fibers (Kintra, n.d.). According to Chua (2020), Kintra sources corn and wheat derived sugar, instead of petroleum, to reduce its resins and fibers that endure a spinning process similar to other synthetic materials to provide a comfortable look, feel, and performance without contributing to microplastic pollution.

Kintra also promotes circular production as their textiles meet physical and chemical recycling requirements as well as industrial composting (Kintra, n.d.). Their products are made for a purpose, but they design for the end of life (Kintra, n.d.).

ECONYL® is another company that strives to create sustainable, circular fabrics for garments that can "Live & Repeat, changing shape and function, and so we can help preserve our planet's resources. From waste to garment, over and over again, in a virtuous and infinite loop" (Econyl, n.d.). ECONYL® takes nylon waste that is polluting the earth such as fishing nets, fabric scraps, carpet, and industrial plastic and through a regeneration and purification process transforms it into ECONYL®. This fabric is the same as new nylon but it can be recycled, recreated and remolded infinitely without losing its quality (Econyl, n.d.). As well as being a solution on waste, ECONYL® regenerated nylon is also better when it comes to climate change. It reduces the global warming impact of nylon by up to 90% compared with the material from oil. Econyl puts it into perspective by explaining that for every 10,000 tons of ECONYL® raw material produced, they are saving 70,000 barrels of crude oil and avoid 65,100 tonnes of CO2 eq. emissions (Econyl, n.d.).

Technology is advancing every day to find new ways to reduce the amount of textile waste in landfills and reduce our carbon footprint, and leather is not an exception. Increasingly companies are using vegan leather in leu of real leather, and it is in fact not the most sustainable choice. Vegan leather is often produced from fossil-fuel derived plastic and tends to be a chemical-heavy process. Vegan leather also is usually not the most durable choice in terms of longevity. Vegan leather cracks, peels, and degrades with every wear and wash and inevitably becomes a piece you can only wear a certain number of times before it is ruined. As it is decomposing, vegan leather also negatively impacts the environment as it releases phthalates and

toxic particles (Nizzoli, 2022). Leather alternatives have evolved as demands for vegan leather has increased and they have started producing fruit-based vegan leather such as Piñatex® by Ananas Anam, a vegan leather from the waste leaves of a pineapple plant. Being the made from the leaves, which are the byproduct from existing pineapple harvest, no extra land, water or pesticides are required to produce the raw material. “From initial sampling to developing a viable supply chain, the Piñatex® journey is inspired by the principles of a Circular Economy and Cradle to Cradle values. The use of pineapple leaf fibre, an agricultural waste product, provides the opportunity to build a scalable commercial industry for developing farming communities, with minimal environmental impact” (Ananas-Anam, n.d.).

**Chemical Processes and Color Choices**

Color and fabric processes are crucial to eco-design choices when it comes to considering the environmental impact of the fabrics water and energy consumption. The fashion industry has caused a variety of environmental issues and chemical processes and color choices have caused a large amount of water and air pollution, generates waste, use of toxic chemicals, and generates mass amounts of waste water (Nayak et al., 2020). Not only are the dye and chemical processes harmful for the environment, but they are also harmful to factory workers and consumers. Increased awareness of the harmful effects of dyes and dyed products has created an increased interest in the revival and use of natural dyes (Adeel et al., 2020).

Chemical processing is one of the most important steps in manufacturing textiles as it adds value to the product while improving comfort qualities and aesthetic properties (Arputharaj, et al., 2016). However, chemical processing requires mass amounts of water and energy and unused chemicals are often disposed along with the processed water which comes at a large cost

to factories and the environment. The textile processing industry is deemed one of the major environment polluting sectors as well as one of the biggest greenhouse gas (GHG) emitters on Earth (Arputharaj, et al., 2016). Research conducted to assess a more sustainable approach to processing and dying by Arputharaj and colleagues (2016) explains that processers practicing sustainability should utilize eco-friendly dyes, chemicals, and auxiliaries and use such processes and machinery to minimize effluent generation as well as installing heat exchangers and utilize processes requiring the lowest energy consumption to minimize the costs and consumption of fossil fuels (Arputharaj et al, 2016). Their research suggests using sustainable alternatives to conventional technologies such as plasma, laser, digital printing, and supercritical carbon dioxide, among others to reduce water and energy usage while reducing the effluent load (Arputharaj et al, 2016). Fabric manipulations, discussed further below, are a useful alternative to traditional dyes and processes that may can provide the desired pattern or look without affecting the fibers ability to be recycled in the biological or technical cycle.

Color choices and dying processes are another important component of the selection process as synthetic dyes are commonly used and monitored due to their environmental destruction, due to containing chemical pollutants such as carcinogenic amines, heavy metals, pentachlorophenol, bleaching chlorine, free formaldehyde, biocides, fire retardants and softeners (da Silva et al., 2021). Natural dyes are a sustainable alternative that are extracted from different parts of the plant (leaves, flowers, fruit, stem and roots) to produce soft tones that are non-toxic, non-carcinogenic and biodegradable (da Silva et al., 2021). As stated above by Na, Kim, and Lee, (2011), on eco-friendly characteristics, achromatic colors are critical to consider for an eco-design, which are black, white and grey (Na, Kim, & Lee, 2011).

## Systems for C2CAD: Applied Minimalist Principles

*"MINIMALISM IS NOT SUBTRACTION FOR THE SAKE OF SUBTRACTION. MINIMALISM IS SUBTRACTION FOR THE SAKE OF FOCUS"*

*ANNOYNOMOUS*

According to Cedric, "The phrase 'Less is More' is not only used in design, but also closely linked to the term Minimalism, which, although is initially referred to an art movement in the 1960's was later applied successfully to design in a multitude of other disciplines" (Cedric, 2011, p. 9, para. 3). Minimalism seeks to use limited material to create a desired affect which directly correlates with eco-design elements outlined by Na and colleagues (2011) and C2CAD principles (Cedric, 2011). Minimalist design offers space for imagination and reduces excess noise in our minds by utilizing fewer elements –getting rid of the excess noise allows for greater focus on the essence which allows for freedom of interpretation (Cedric, 2011). This freedom of interpretation that minimalism allows is essential for the designer to evoke meaning to the user, meanings that align with sustainability, longevity, and timeless design.

In the 1980s, two types of minimalist fashion movements occurred, larger companies utilized clean and chic purism to practice minimalism while smaller companies moved towards a more conceptual minimalist approach that brought on deconstructionism (Gubensek, 2017). Deconstructionism at its roots is the reduction of the garment to its most fundamental parts – a fundamental element of minimalist design. According to Gubensek (2017):

> In fashion context minimalism concentrates more on the form and fabric than on the function of the clothing. Through the process of reductivism that strips the design object to its necessary elements, the minimalist designers often play with lines and geometric shapes in monochrome palette (Gubensek, 2017, para. 4).

Minimalism as an apparel design concept directly correlates with sustainability by stripping down the process to its fundamental elements and reducing the environmentally destructive layers of production, to produce apparel that is timeless, functional, comfortable, and practical for the modern woman. Minimalist design, according to Walker, is when "Emphasis is laid on high-quality investment pieces that are long-lasting and immune to occurring and changing trends" (Walker, 2011). There is a common correlation of minimalism and timeless, quality pieces in research, as according to Gubensek, minimalist design is about "focusing on timeless qualitative pieces instead of quantity" (Gubensek, 2017). To achieve the high-quality investment pieces Walker (2011) describes, and qualitative pieces that Gubensek (2017) outlines, the physical durability is one of the most important factors to achieve a minimalist, eco-designed garment made for longevity. The physical durability refers to creating a garment that is made to last and can resist damage due to wear (Circular.Fashion, 2018). Then, to achieve a long-lasting, quantitative piece, that is immune to occurring and changing trends, designers must understand aesthetic durability to create a piece that will not become outdated as well as the physical durability.

Aesthetic durability involves moving away from rapidly changing trends to create apparel that lasts by designing for either "the pleasure of the familiar" or "the pleasure of the unfamiliar," or a combination of the two (Harper, 2017, p. 3, para. 4). Designing for the pleasure of the familiar involves turning away from trends to design pieces to be classic and timeless, this happens during conceptual design by designing harmonic shapes and well-balanced pieces as well as during the color selection phase of the design process (Circular.Fashion, 2018). Designing for the pleasure of the unfamiliar aims to achieve aesthetic durability by creating

unique or one-of-a-kind pieces that utilize colors, shapes, textures, etcetera to be more interesting, resulting in a piece that will be kept for a long time (Circular.Fashion, 2018).

Similar to eco-design, minimalism supports sustainability efforts by adapting a more simplistic design and production approach that reduces the amount of resources exhausted in design and production. This can be achieved by utilizing several design and production strategies, further discussed later, such as mono-materiality, textile manipulations, designing for disassembly, etcetera to simplify the process and prolong the life of a garment. Each of these design and production strategies when looked at through a minimalist perspective can achieve eco-design by stripping down the layers that can be distracting or harmful to the environment. By removing the distractions you are left with a timeless, high-quality, durable garment free of unnessesary elements and that is the goal of minimalist design. To support this perspective, according to research by Chim & Blebeab, 2013:

> Instituting simplicity as a goal, "minimalism in not to be equated with simplicity", but rather a sum of principles that "go to extremes to create a focus of the recipient, an involvement of the user, and a way of looking at things – a minimal perspective. Minimalist simplicity is the result of "rigorous focusing through the elimination of distraction (Chim & Blebeab, 2013, para. 6).

In relation to eco-design, minimalist principles align with conceptual design choices to practice slow fashion with traditional production runs, designing multifunctional pieces that may be worn a variety of ways. Minimalism principles correlate with eco-design choices of sustainable materials and manufacturing processes by utilizing natural materials with minimal dyes and processes, as well as ensuring quality and durability through manufacturing garments with a shared or similar longevity of a seam, fabric, fastening, facing. By turning to minimalism, these

qualities are more attainable as the process is stripped down to the fundamentals, revealing core components of garments that are designed to be functional and durable. Minimalism and eco-design share similar values when it comes to chemical processes and color choices, both aim to eliminate distractions that take away from the focus of the piece. For minimalism, this means eliminating loud, harsh, or flashy colors and prints and for eco-design, also eliminating unnecessary elements or processes and those that have a negative environmental impact.

**Conceptual Design Choices**

Bardey and colleagues (2022) describes minimalist fashion as being best known for having "clean, contemporary lines, monochromatic color palettes, architectural flare, and timeless nature, minimalism represents its own category in fashion (Bardey et al., 2022, p. 117, para. 2). For conceptual design, this means starting the design process by illustrating *silhouettes* consisting of the basic shapes formed by the outer lines of the clothing (Qurashi, 2021). According to Gubensek, minimalist design elements go back to the necessary basics such as lines and geometric shapes to construct apparel that is timeless, functional, and comfortable (Gubensek, 2017). Eladwi and Kotb (2015) research outlines how minimalism, in terms of fashion design and production, means designing every element and detail to be cohesive and serve multiple visual and functional purposes by utilizing:

- Natural textures, neutral colors, clean and fine finishes,
- Ornamentations are quality rather than quantity,
- Structural lines for decoration,
- Basic geometric shapes as outlines,
- A single shape or a small number of similar shapes for components for design unity,

• Natural and non-fussy bright color combinations,

• Natural patterns and accessories, as well as the economic and functional value. (Eladwi and Kotb, 2015; VanEenoo, 2011; Park and Yim, 2013)

All the elements outlined above are critical during the design process for both eco-design and minimalism to achieve C2CAD. Designing apparel that accomplishes minimalist principles of clean shapes, unity, and quality is apparel that will evoke a sense of timelessness and comfort for the wearer for years to come. Following minimalist principles during the conceptual design phase, a designer must also consider the aesthetic durability of a piece. During this phase, aesthetic durability may be achieved by designing pieces that execute "elegant styles, harmonic shapes, easy-to-read, well balanced and with well proportioned cuts" (Circular.Fashion, 2018, p. 12, para. 1).

The next step is defining the *pattern lines* that divide the space within a garment such as darts, cutouts, seams, pockets, sleeve hems, collars, pleats, tucks, gathers, etc (Qurashi, 2021). These pattern lines are crucial at the design phase for comfort and functionality of the garments. Defining pattern lines is critical as these sketches lead to developing flats and patterns to create the physical garment. Minimalist principles when applied to pattern lines can allow designers to implement a more sustainably oriented pattern making process by minimizing material consumption and reducing cutting waste, further outlined in the next section (Kazlacheva, 2021). Similar to eco-design conceptual design choices, minimalist principles applied to define pattern lines such as drop shoulder sleeves and peplums, will minimize waste and create comfort, which determines the amount of wear and ultimately longevity of the piece (Kazlacheva, 2021). Additionally, when defining pattern lines, applying minimalist techniques with a focus on convertibility allows designers to create pieces that can be converted and used for many

functions. Focus on convertibility and reversible designs requires a cohesive design down to the smallest details for a variety of wears and styles. Multifunctionality, as outlined in eco-design conceptual design choices, is possible when using this process to design apparel to be worn in many ways in different styles for optimal user comfort. Multi-functional designs creates pieces that hold value for customers as they can buy 1 piece and wear it 3 ways.

Optimal ergonomic comfort can be achieved by designing the garment to have freedom and range of movement by considering body shaping, pattern making and sewing (Cunha and Broega, 2009). This comfort can be accomplished through pattern lines by utilizing darts for pants, blouses, coats, etcetera to provide proper fit and ease of movements without being too loose or tight. Sleeve hems, collars, and armholes are critical to the ergonomic comfort of a garment. Accounting for sleeve hems will allow the arms to move properly, collars must not be too tight or restrictive, and armholes and sleeve cuffs also must be properly accounted for to provide optimal comfort and movement – i.e. small sleeve cuffs will make the whole garment tight across the body. Properly grading these elements will be crucial for proper fit for a range of sizes in a collection. Pleats, tucks, and gathers are all elements that require more fabric to create this movement designed through the pattern lines that provide freedom and movement for the garment when utilized properly. Following minimalist design principles, pattern lines, when kept simple, will create a focus of the piece by adding or subtracting from the design to create interest for the wearer.

The final step is considering the *fabric details* starting from colors, prints, textures, and embellishments like applique, fringe, etc (Qurashi, 2021). Similar to pattern lines, the fabric details also will create focus for the piece and establish interest through color choices, textures, and other elements when used minimally. Monochrome color palettes consisting of natural or

earthy colors are optimal for a minimalist design and provides a clear path during the design process when selecting fabrics and materials to create a cohesive collection (Gubensek, 2017). Leather piping, grommets, exaggerated seams, belts, and drawstrings are just a few elements of fabric details that add interest to the garment while remaining minimal. These elements may also be used as a technique when designing minimally to bring in color to the design, i.e. a topstitch inside garment with tonal thread or contrasting thread, without becoming too distracting from the focus of the piece.

According to Gwilt and Pal (2017), research on conditional garment design, they found that a variety of design led approaches can be used to achieve longevity for garments. Their research details that incremental garment design is a practice that, when combined with mono-materiality, promotes a circular economy, and thus, C2CAD. Gwilt and Pal (2017) describe incremental garment design characteristics and features in terms of longevity as:

> Incremental garment design: in terms of designing for longevity informs designers to consider the key attributes or micro design elements, such as garment form, features, garment proportion, color and print, themed references, and genres in fashion (Seivewright, 2007), to be incrementally updated leading to garment life extension. Here it could be suggested that in terms of design for longevity it is important to reflect on the key attributes in terms of the contribution to extending the lifetime of the garment. The garment without these incremental design features is ready-to-wear but with low user appeal for its long life (Gwilt and Pal, 2017, p. 151, para. 5).

Designers must take a closer look at each element of a garment to execute incremental garment design, beginning with the silhouette. The silhouette, when using minimalist elements, should be easily read with clean lines and shapes. The silhouette should remain the same as a whole and

when transformed to remain true to minimal standards and prevent the design from being overdesigned, shown in figure 2.3. Figure 2.3 shows the modular design of dress, including material using a quilted fabric manipulation, that can be transformed by removeable elements, in this case using ties, by Nina Donis Autumn/Winter 2011/2012. Executing incremental garment design must be considered during the conceptual design phase as the designer must also evaluate the options of adjustments, as seen in figure 2.3, the dress can be untied to be sleeveless, to remove the skirt component to be worn as a top or a skirt. It is crucial to determine how many ways the design can be transformed by the user and how easily understood and useful the alternative wears will be. This will protect the design from becoming too complex or difficult to execute by keeping the changes minimal and useful. The ease of use will be determined at the design stage which will impact how easily the garment can be understood by the potential wearer. Therefore, it is important to turn to minimalist principles to keep designs simple, not to become too excessive, for the uses to be easily understood by the wearer.

**Figure 2.3**

*Modular design of dress*

*Note*: Designed by Nina Donis Autumn/Winter 2011/2012.

**Sustainable Materials and Manufacturing Processes**

Minimalism applied to materials and manufacturing is where designers and other integrated team members must come together to revolutionize the way a garment is created, revitalized, and ultimately recycled. Here, minimalism may not exactly be the traditional "less is more" perspective. It can be more steps or added processes to achieve the desired circular design as well as the optimal quality, durability, and aesthetic of the garment. When selecting materials, choosing clean, natural materials such as cotton versus synthetics, allows the materials to successfully circulate through the biological cycle to reduce waste and minimize loss of raw materials. Synthetics should be carefully selected so that they can be mechanically or chemically recycled and regenerated through the technical cycle. Both options can successfully achieve minimalist goals by reducing the layers of production by utilizing materials that are previously

recycled or can be recycled in the future to minimize waste. There are several ways to practice minimalism alongside eco-design to successfully achieve the design and production of an aesthetically and physically durable piece.

As mentioned above, incremental garment design is one of the strategies for creating a piece that has several ways to be worn. Mono-materiality is an important factor to be executed for not only incremental garment design but for any design strategy that aims to be cradle-to-cradle. Designers that take a mono-cycle approach to apparel design aim to create garments comprised of the same materials that are suitable for being recycled and regenerated within the same cycle, the technical cycle, or the biological cycle (Circular.Fashion, 2018). To execute mono-materiality in apparel design, it would mean sourcing trims, closures, and other elements of the garment such as buttons, thread, and labels that are the same fibers as the main material, as well as interfacing and lining if applicable (Gam et al., 2009). This allows the garments materials to easily be recycled by going through the same cycle to minimize or eliminate waste. Materials best suited for mono-materiality are versatile natural fibers such as cotton or synthetic fibers such as polyester, nylon, and biodegradable polymers (Circular.Fashion, 2018). This design practice effectively fosters both eco-design and minimalist principles by designing a circular, harmonious piece.

Designing mono-material apparel may come with challenges and downsides like sacrificing the aesthetic or quality of the garment or its components. If more material diversity is necessary to achieve the desired function or aesthetic of the garment, there is another design strategy that has become increasingly used, design for disassembly (Gam et al., 2009). Design for disassembly directly follows the cradle-to-cradle model, as the 12 Principles of Green Engineering outlined above by McDonough and colleagues (2003), research states “Material

diversity in multicomponent products should be minimized to promote disassembly and value retention" (McDonough et al., 2003). Design for disassembly is an effective material management strategy for designers to utilize to account for a mixture of biological and technical nutrients of a garment (Gam et al., 2009). This allows for garments to be "dismantled for easier maintenance, repair, recovery, and reuse of components and materials" (Gam et al., 2009, p. 177, para. 3). This design strategy can be done by using detachable closing mechanisms, such as removeable buttons, buckles, loops, etcetera so that the different materials may go separately at the end of its wearable life to its respective cycle (Circular.Fashion, 2018). An example of a design that utilizes modular design and design for disassembly is shown in figure 2.4, where Anrealage produced garments made to be mixed and matched by designing modules that are attached with snaps. Their design for deconstruction allows for easy repairs, the ability to create many different styles, and the use multiple fabrications that can be recycled separately as they are each their own component. This process allows designers to rethink traditional closing mechanisms, garment structures, and assembly methods which can revolutionize the future of design as it will benefit the garments repairability with innovative techniques such as removeable closures or screw on buttons and recycling innovations such as dissolvable seams when extreme heat is applied (Circular.Fashion, 2018). For materials to be regenerated for endless use, it is important when selecting materials for design for disassembly that designers minimize the material diversity as well as selecting materials that can be recovered separately and recycled as biological or technical nutrients (Gam et al., 2009).

Materials are critical to the physical durability of a garment designed for longevity. The physical durability is greatly impacted by the garment construction and can be strengthened by careful selection of materials of high quality, durable and fit for purpose (Circular.Fashion,

2018). According to Circular.Fashion, the process of selecting materials to promote the physical durability of a garment, designers must consider the fabric weight per unit area, the knit/weave construction and density, the tear strength, the shape resilience and abrasion resilience (Circular.Fashion, 2018, p. 11, para. 1). Here is where utilizing a minimalist approach may not be "less is more," as designing a high-quality, durable piece often requires more material, trims, and processes to achieve the desired end. Well researched and careful material selections, such as durable wool, can greatly improve the designs physical and aesthetic durability by meeting all the quality standards outlined for the physical attributes as well as being aesthetically pleasing and timeless.

To achieve a successful multi-functional design following minimalist principles, designing a reversible garment can be done by selecting double-faced fabrics to minimize main fabric materials used. This encompasses the minimalist view of subtraction for the sake of focus by designing the garment to be simpler in form like material, but more complex by being transformable in function by reversing to a new look in color or texture. Designers can also design a multi-functional, transformational, garment through a modular design approach. Modular design separates a garment into smaller parts, creating new functionalities that allows the user to adapt the piece to be different styles and meet changing needs (figure 2.4). This also creates an added value by allowing for the garment to be easily "customizable, adaptable, updateable or easily repaired in parts" (Circular Fashion, 2018, p. 13, para. 1). This allows designers to create more flexibility in design and wear by creating customizable elements utilizing zippers, buttons, or loops such as removeable hoods, vests, sleeves, or removeable buttons. As humans we are not stagnant so our clothes shouldn't be either, modular design can

allow for updateable customization for the user by designing a garment that gives the user the option to change or adapt their piece over time.

As shown in figure 2.4, modular design combined with minimalist characteristics creates a garment that holds more value as it is multiple pieces that can be removed, mixed and matched, and altered, to provide desired comfort or style. Figure 2.4 displays a complex modular design that creates endless looks by utilizing hidden snaps to create and alter silhouettes. Each module, composed of interchangeable, modular blocks of geometric shapes (squares, rectangles, triangles, columns and semicircles) designed with identical dimension and proportion to snap together seamlessly. This allows elements to transform from cuffs to collars, bodice to skirt, long sleeves to short, and most importantly, allows the user to mix and match and create a completely new garment. This transformable strategy can prolong the life of a garment by strengthening the functional, emotional, and aesthetic durability of the piece for the user as it can be altered by the wearer to fit the environment, social setting, or any desired look (Circular.Fashion, 2018).

**Figure 2.4**

*Modular designs, inspired by building blocks*


*Note*. Design utilizing hidden snaps for diversity of styles created by Kunihiko Morinaga for Anrealage, Autumn/Winter 2020.

Along with selecting a physically and aesthetically durable main fabric, to further address durable properties, it is important to design garments fit for purpose and identify parts of the design that are liable to stress to minimize wear from use by reinforcing vulnerable areas (Circular.Fashion, 2018). Designs that are fit for purpose should be well thought out to identify weak areas, such as the crotch or elbows, which can be reinforced by extra stitches, or by utilizing high quality knitted trims at the neck on a less resilient fabric to prevent losing shape after many washes (Circular.Fashion, 2018). Reinforcing areas susceptible to stress can be done by double stitching, double layers of fabrics or fixing stitches with a thick thread as well as

utilizing uncommon stitches such as the manual saddle stitch that creates a knot with every punched hole to strengthen the stress point (Circular.Fashion, 2018).

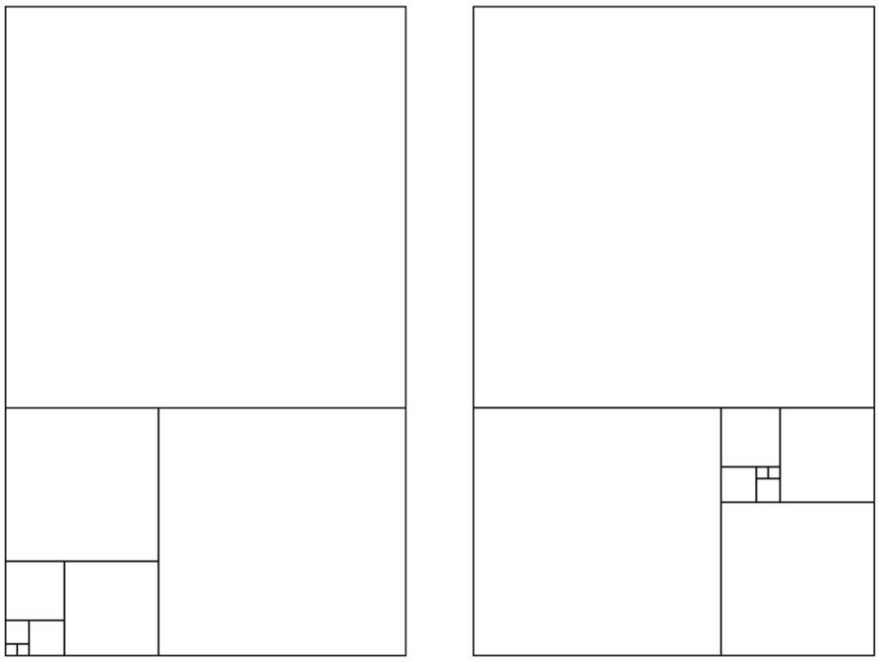
For production, a minimal approach involves minimizing waste by utilizing fewer materials which can be achieved by having fewer production runs (traditional two seasons a year) as well as smaller production runs (avoid overproduction), which creates a need for less transportation of materials and finished pieces, resulting in less of an environmental impact. Smaller production runs allow designers to produce higher quality and higher value pieces as there is a limited quantity. With less production, more time goes into each piece, making a piece that is of high quality and built to last. Producing in limited quantities will hold more value and create a unique experience for the consumer as they purchase a piece, creating a stronger emotional connection that will foster a piece that is taken care of and not easily let go. This method of production adds value to the garment, as it is both designed for the familiar, and by being limitedly produced, designed for the unfamiliar. Above all, a minimal approach to design and production places the quality over the quantity and emulates how less is more.

Additionally, after designers develop minimalist conceptual designs by developing pattern lines in sketches, flats, and CAD illustrations the next step would be to develop patterns for the garments. Pattern making involves taking the design sketches and flats and drafting them into pattern pieces of the physical garment usually based of a generic sloper, which are the building blocks for pattern making, based off the natural lines of a figure. Pattern making is crucial to achieve the desired functional and aesthetic garment that is of the highest quality, best fit, and timeless appeal. Pattern making research shows that by applying the Golden ratio and Fibonacci sequence in pattern making can be helpful to creating beautiful and harmonic forms (Kazlacheva, 2017). The Golden ratio can be applied to pattern making by utilizing the golden

triangle or golden rectangle as a frame for the design or directly for pieces or elements of the garment (Kazlacheva, 2017). When applied directly or as geometric figures, this strategy allows for designers to create “different types of seams in the bodice and sleeves; contours like necklines and armholes; 3D elements” (Kazlacheva, 2017, p. 2, para. 2). Kazlacheva further explains how applying the Golden and Fibonacci proportions can be used in pattern making to create visually pleasing and functional shapes, when creating 3D elements, such as bi-sided tucks and fixed in ruffles that can divide the garment proportions using the Golden ratio (Kazlacheva, 2017).

**Figure 2.5**

*Fibonacci series tiling*



*Note*. Fibonacci series tiling with squares in two perpendicular linear directions (left); Fibonacci series tiling with squares in a spiral direction (right).

Utilizing different slopers, with the basic measurements of a bodice, skirt, or pant, allows designers to have a base for creating new patterns for designs which can be made into a prototype or sample garment. From there, the sample will be fitted, and measurements taken to then go back to the original pattern and make manipulations, such as adding darts or seams, for a better fitting, functional, and aesthetically durable garment. These patterns are then carefully graded, or made smaller and larger, to fit different sizes. Kazlacheva found that when designing patterns, such as drop shoulder instead of one-piece sleeves, designers can lower the consumption when cutting due to the height difference of drop shoulder sleeves compared to one-piece (Kazlacheva, 2021). Patterns may also be utilized to identify stress points that were previously described to identify areas of the garment, before production, which gives designers the opportunity to make decisions regarding stitches or seam allowances to promote the physical durability of the garment. According to Kazlacheva, "Small changes in design can be made at the pattern making stage, which will safe basic concept of a particular design idea and will minimize material consumption and reduce cutting waste" (Kazlacheva, 2021, p. 196, para. 4). Following minimalist design principles by utilizing clean, proportional shapes when creating patterns and elements of a garment utilizing the Golden ratio or Fibonacci sequence, may lower the consumption of material and reduce cutting waste to create a more aesthetically pleasing and sustainable garment. Fibonacci sequence tilings (figure 2.5) is a useful strategy to further break down the garment's pieces to "unites the possibilities for zero or minimal waste pattern making with proportions which symbolize beauty and harmony" (Kazlacheva, 2021, p. 196, para. 3). Additionally, the pattern making process is essential to reducing waste or achieving zero-waste by using strategies such as the jigsaw puzzle. The jigsaw puzzle is done by strategically placing all pattern pieces on a single piece of fabric with big pieces (bodice and sleeve) and small pieces

(pocket, cuff and collar) without any fabric waste (Jalil & Shaharuddin, 2019). Breaking the garment down through modular design can make achieving zero-waste more attainable by using the jigsaw puzzle as the components are more uniform in shape and easier to fit together.

**Chemical Processes and Color Choices**

According to Gubensek (2017), through process of reductivism, minimalist design considers the garments necessary elements including the color palette. Monochrome color palette, including earth colors, muted colors, and most importantly for a whole collection, cohesive colors, are important to consider for both a minimalist design and for the creation of eco-capsule wardrobe pieces. A capsule wardrobe is a minimalist practice that limits the number items in a wardrobe, focusing on "quality, longevity, and minimal or classic design" (Bardey et al., 2022, p. 113, para. 1). This means a wardrobe contains the essential, or core, investment pieces such as neutral underpinnings (tops) and transitional pants, skirts, and coats that may be worn in many outfit variations, making it easier to manage and assemble outfits. Capsule wardrobes should have a base color scheme, with pieces that are easily coordinated with each other, usually consisting of neutrals such as white, black, brown, grey, or navy. This allows for items to be easily interchangeable, to create a variety of outfits utilizing accent colors that complement the base colors in other pieces. When designing pieces to comply with capsule wardrobe and minimalist characteristics, large, bold patterns should be avoided, turning to a small, repetitive, low color contrast pattern when necessary (Mak, 2017). This could be classic, simple patterns, such as an easy plaid, or a textile manipulation, discussed in more detail later, to turn the fabric into a 3-dimensional material that gives the illusion of pattern by creating texture (Wahab, 2018).

The core pieces of a capsule wardrobe should be pieces that can be worn year-round and augment with seasonal pieces that may contain accent colors (Mak, 2017). Capsule wardrobes have shown to decrease decision fatigue linked to overconsumption, high-expectations, and social comparison liked to select everyday outfits (Bardey et al., 2022). According to research, an individual's capsule wardrobe, in Western societies, is "created per season (every 3 months) and includes 30 to 50 items of clothing. For each new season, a new capsule wardrobe is created, often consisting of pieces from the previous wardrobe and new items" (Bardey et al., 2022, p. 117, para. 4). Mak (2017) describes curating a capsule wardrobe using the 80/20 rule, meaning that 80 percent of the wardrobe is classic staples and every day with key daily accessories in just three to four neutral colors such as white (or off-white), creams, stone, beige, black, gray, charcoal, navy, brown, and also denim, so the pieces will pair seamlessly with each other in terms of color (Mak, 2017). The other 20 percent of the wardrobe is accent-colored, trend-based clothing in two to three accent colors to add interest to the wardrobe (Mak, 2017). The pieces should also be selected appropriately for the seasons and carefully picked so one does not have light linen skirts in the winter and dark jackets in the summer. Capsule wardrobe research found that color is usually the biggest factor of an individual's selection in capsule wardrobe pieces, as well as material and silhouette (Bang, 2019).

The 80/20 rule is not only a good strategy for curating one's capsule wardrobe, but also for designers when creating a collection. This rule could be utilized when designing and producing cohesive, capsule wardrobe collection pieces by picking three to four neutral colors to utilize for roughly 80 percent of the collection and then selecting two to three accent colors for the 20 percent left. This also could be utilized to incorporate accent colors in the main garments in a minimalist form by featuring the accent colors in roughly 20 percent of the garment, such as

buttons, grommets, belts, trims, reversible facings, exedra. It is critical when designing for the warmer seasons to choose lighter fabrics and colors for the collection, and for cooler seasons heavier fabrics with darker colors. Designing collections with the 80/20 rule in mind, designers can create minimal pieces within a collection that are seasonally appropriate while remaining fashion forward yet timeless. Fashion forward does not have to be designs following rapidly changing trends, rather following eco-design and minimalist principles, fashion forward can mean designing timeless pieces that are still visually or functionally interesting with pops of color, texture, or easily changeable elements. Following both eco-design and minimalist concepts for conceptual design, materials, and color will allow designers to effectively design and produce pieces holding quality, longevity, and minimal characteristics required to be a part of one's capsule wardrobe.

Utilizing a minimalist approach to the chemical processes and color choices also applies to textile printing of patterns and designs. Prints and patterns challenge minimal principles, adding seemingly unnecessary steps in the design and production process as well as features to the physical garment that may not ring true to minimalism as they take may away from what is the focus of the garment itself (Chim & Blebeab, 2013). The process of textile printing that applies color to textiles to create patterns and designs has created a challenge when recycling textiles due to the added synthetic glues, print paste and surface treatments (Circular.Fashion, 2018). There are several recyclable textile manipulation strategies that effectively replace traditional methods of printing to create decorative textiles without the use of prints (Circular.Fashion, 2018).

Alternative forms of fabric manipulation to create shape, texture, or patterns without harmful dyes or processes would decrease the environmental during production and increase the

likelihood of the garment to be recycled as the manipulations would not affect the fibers' ability to cycle through the biological or technical cycle for cradle-to-cradle production. The shape of the garment could be manipulated through smocking, for example at the waist, to avoid elastane which limits the possibility of recycling (Circular.Fashion, 2018). Fabric manipulation techniques can provide color or texture to a design without impacting the fibers circular life. Figure 2.6 showcases a few examples of textile manipulations seen on the runway, such as laser cutting to create sheer elements, quilting techniques that utilize small pillows of fabric to add texture, smocking to create geometric patterns, stitches or binding that experiment with thickness or contrast of thread, weaving to create dynamic movement, pleating and tucks to create fullness, and several more (Circular. Fashion, 2018; Wahab, 2018).

**Figure 2.6**

*Recyclable, modular, and mono-material fabric manipulation techniques*

As displayed in figure 2.6, there are many manipulations to create a more dynamic and interesting piece, designers must experiment with innovative ways and combinations of fabric manipulations of biological and synthetic materials to reach desired patterns, colors, textures, and functional finishes to create a circular design (Circular.Fashion, 2018). These fabric manipulations also may increase the physical durability and promote longevity, as some may create a more strong, durable garment such as weaving, provide a better fitting garment with flexible designs with smocking, or improve comfort by utilizing tucks or pleats for volume and ease of movements. Each of these manipulations may improve the physical durability while adding some aesthetic element of pattern or movement to the garment. Considering the physical durability of the design, finishes can be applied to address moisture, stains, and odors that can occur to promote longevity of the garment (Circular.Fashion, 2018). It is also extremely important to fully understand the manipulations, materials, trims, and stitches of the design to communicate adequate care instructions and offering repair and reuse services to lengthen the life of the piece for the wearer.

Another creative way to manipulate textiles and reach a pattern or creative color combination would be by utilizing the Fibonacci sequence which is useful during pattern making to create more interesting elements. Utilizing the Fibonacci sequence tilings (figure 2.5) is a powerful tool to unite minimalist characteristics, such as combining monochrome colors, and eco-design as it will reduce waste when properly cut (Kazlacheva, 2017). Fibonacci sequence tiling can be used as patchwork or paneling to combine colors, as shown in figure 2.7, creating a harmonious design with aesthetically pleasing contrasts or simple pops of color within the design, creating timeless, simple patterns without the use of harmful dyes or printing elements.

Figure 2.7 displays how patchwork paneling can be used to define the silhouette as well as create contrast and define panel lines using stitching. This technique may also be used to add textured panels or to create modular garment with removeable or reversible elements such as those shown in figures 2.3 and 2.4.

**Figure 2.7**

*Fibonacci sequence tiling in apparel design*

*Note*. Minimalist, monochrome design featuring paneling and contrasting stitches by Maria Grazia Chiuri for Valentino Autumn/Winter 2015 (left). Minimalist color scheme, following 80/20 rule using accent color as paneling for leather detail that also adds texture by Phoebe Philo for Céline Fall 2011 Ready-to-Wear (right).

## Theoretical Framework: Semiotics

The discipline of semiotics is defined by Eco (1976), as being "concerned with everything that can be taken as a sign" (Eco, 1976, p. 7). Semiotics deals with signs taking the form of words but it is not only the "signs" seen in everyday speech, but anything that "stands for" something else, such as material objects (Chandler, 1994). We interpret our surroundings

every day, as we are taught there is always something more to what we see, hear, or read – i.e., road signs have meanings we interpret while diving based on acquired knowledge – and semiotics addresses the associations, interpretations, and acquired knowledge that influences this understanding of something more (Harper, 2017). According to Harper, when we consider physical objects or things as "carriers of added value or different messages, we are effectively travelling in the realm of connotations, symbols, and myths, all of which belong to the science of signs: semiotics" (Harper, 2017, p. 21, para. 2). Simply put, in the semiotic lens, everything is a sign, and all objects contain meaning and messages, however, the message will affect the recipient if it makes sense to them (Harper, 2017). The recipients connotative frame determines what connotations appear when encountering an object, determining how one will decode or interpret the message, which is based on our cultural context, our beliefs, and our values, as well as our lifestyle and social circle (Harper, 2017).

***Semiotics, design, and fashion***

According to Guedes and Buest, "semiotics is an epistemology that provides a conceptual framework and a reflective method, from the very outset and throughout the design process" (Guedes and Buest, 2018, p. 204, para. 1). The fashion design sector demands professionals with a holistic view, comprised of those professionals which are "creators and empathizers, pattern recognizers and meaning makers" that can interpret a broad, hybrid landscape in order to balance aesthetic and creative notions with practical functions, the logic of markets, production, and consumption (Guedes and Buest, 2018, p. 200, para. 2). According to Guedes and Buest, if we regard the process of assembling materials, shapes, textures, and silhouettes to create clothes that gain meaning, then it is appropriate to explore semiotics "to comprehend and transpose social codes" that result in "innovative and meaningful design solutions" (Guedes and Buest, 2018, p.

200, para. 2). “A dress can exude elegance and exclusivity, or it might emanate with a subdued sense of functionality and substantialism. These are all words and terms associated with cultural value, identity, and lifestyle” (Harper, 2017. p. 21, para. 1). According to Harper, it is possible for the sender of a message to control or anchor connotations evoked by the recipient when the sender understands the recipients connotative frame or what they believe to be true which is “highly contingent on social meaning exchanges and cultural convictions” (Harper, 2017, p. 23, para. 2). Designers that research their target market and understand their connotative frame can tailor the desires evoked by their product.

Today, an object’s value, apart from the monetary value or perceived quality of design, is often related to the personal meaning of the object. Meaning is associated with personal lived experience that the object has previously, currently, or are expected to provide for us. According to Guedes and Buest (2018), this value has a “material, conceptual and affective or emotional components” (Guedes and Buest, 2018, p. 198, para. 1). This notion is quintessential to designers, as they not only identify and create objects but also decipher, interpret, and create meaning. The meaning that designers create reflects social and cultural landscapes and interpretations of contemporary reality, which then allows designers to propose meaningful solutions (Guedes and Buest, 2018). Therefore, semiotics is foundational for fashion design as it promotes a deeper understanding of the roles signs play in the “creation and diffusion, and decoding and reinterpretation of fashion” Guedes and Buest, 2018, p. 198, para. 1). Semiotics, when viewed as the foundation for fashion design practices, is not only a method for interpreting objects or design practices, but also a valid epistemological grounding for fashion design practice entirely, as it offers a theoretical framework for designers to think about their practices and an

awareness that meaning is embedded in dynamic code systems that are context-dependent (Guedes and Buest, 2018).

### *The semiotic state of fashion design*

Deni and Zingale (2017) explore how semiotics has traditionally been used as an analytical tool, semiotics on design, and as a methodology, semiotics for design which results in semiotics viewed as a "mechanism" operating inside the design rather than a microscope to analyze the results of a design (Deni and Zingale, 2017). A semiotic approach to fashion design is not solely a directive process that imposes the designer's view, but an encoding and decoding process that both proposes and deconstructs codes which becomes a "co-creative, or constructivist, negotiation between designer and wearer" (Guedes and Buest, 2018, p. 201, para. 1). Guedes and Buest (2018) propose a framework comprised of four relations between fashion design and semiotics, based on Deni and Zingale's (2017), focusing on the theoretical frame work that semiotics must be viewed as a 'mechanism' operating within the design, to demonstrate the importance of developing a holistic view that incorporates "the local and the global and covers the processes of creation, production, distribution, and consumption within their social and cultural contexts" (Guedes and Buest, 2018, p. 198, para. 2). Their research presents the four premises of semiotics, the "reflective process uncertain process, encoding-decoding process, and prospective process", that form the "Semiotic State of Fashion Design" that are recommended for implementation to promote a "transversal form of understanding throughout the fashion design process" (Guedes and Buest, 2018, p. 202, para. 5).

Beginning with *semiotics as a reflective process (imaginative)*, for fashion design, this is the stage where design "gives a visual form to what has been imagined" by the designers "exteriorization of imagination to create a connection" between imagination, ideals, inspiration

and the physical concrete designs (Guedes and Buest, 2018, p. 204, para. 1). During this phase, signs are identified within inspiration and designers utilize technology as a tool to display these signs in the inspiration boards, previous collections, and patterns. From there, through "observation, interpretation, and the development of a lexicon of knowledge" of the signs, designers will develop not one concrete solution, but a resource for future projects (Guedes and Buest, 2018, p. 204, para. 1).

The next premise their research proposes, *semiotics as uncertain process (open project)*, which concerned with the evolution fashion objects in relation to the fashion design process as well as when they are materialized and interpreted in the world within the complex, dynamic, fast-paced industry (Guedes and Buest, 2018). Items of clothing can signify a particular mindset, such as fur signifying luxury, however this mindset is in a constant state of change and "may be transformed," such as fur signifying "environmental irresponsibility" (Guedes and Buest, 2018, p. 206, para. 2). How these objects are interacted with socially carries uncertainty, mainly rooted in the notion of 'how will I be seen,' which entails how these signs are interpreted and the meanings interpreted then exchanged, enhanced, or devalued. This evaluation then carries the objects into the "cycle of fashion (dissemination, adoption, and discard)" which is never fixed and always in a "state of flux" that can transform the particular mindset towards an item (Guedes and Buest, 2018, p. 206, para. 2). The semiotic state of fashion design must be utilized by fashion designers to "acknowledge, recognize and thrive within dynamic conditions" (Guedes and Buest, 2018, p. 206, para. 1).

Guedes and Buest's third premise, *semiotics as a prospective process (anticipatory)*, is the result of the previous premise, that allows designers to acknowledge this state of flux that transforms mindsets and addresses this by utilizing the concept of semiotics as a "prospective or

predictive science" (Guedes and Buest, 2018, p. 206, para. 3). This premise allows designers to develop and structure their thinking and actions "an abstract one, based on divergence, on connotation, on imagination" to thrive in an environment that is rooted in dynamic change (Guedes and Buest, 2018, p. 206, para. 3). This practice promotes a forecasting aptitude as it anticipates changes and innovations according to the "psychological, sociocultural, economic, and technological mood of the period" (Guedes and Buest, 2018, p. 204, para. 2).

Lastly, Guedes and Buest's research final premise, *semiotics as an encoding-decoding process (communicational)*, involves the communicational aspects present in all tools and processes involved in the planning phase, such as mood boards, prototypes, technical patterns. This also involves the distribution and consumption processes involved, how the objects communicational aspects are interpreted. This use of semiotics as a mechanism for communication involves the usage of these objects as a tool, utilized by the wearer to share or conceal their "aspirations, expectations, desires, or states of mind within a sociocultural context" (Guedes and Buest, 2018, p. 207, para. 1). The communicative component of these objects are present in both the tangible clothing and the intangible concepts, beliefs, and sociocultural meanings rooted in the objects through fashion design (Guedes and Buest, 2018, p. 207, para. 1). The feedback and reinterpretation from wearer is quintessential to understanding how fashion design becomes a signifying system through the communicative tools embedded in objects and how it is used and interpreted by the wearer, which according to Guedes and Buest, this is the objective of social semiotics. According to Guedes and Buest, "Thus, the semiotic state of fashion design is reciprocal and socially constructed" as designers benefit from the feedback and reinterpretations from the wearer to better understand the objects communicative functionality "as social encoders/decoders (meaning makers/interpreters), fashion designers and wearers

synthesize information and establish connections through clothes" (Guedes and Buest, 2018, p. 207, para. 2).

***Semiotics applied to C2CAD and MONO***

Semiotics allows for a deeper look into C2CAD research, the strategies to implement this method, and design practices used by a fashion brand and/or fashion designers where meanings are created within a vast signification process that guides their design approach. Semiotics opens up a prospective, open-minded imaginative form of questioning, because if everything is a sign and objects contain meaning, then it is fundamental to fashion designers to explore and comprehend explicit or implicit codes to create connections between the immaterial and materiality to convey meaning within designs in a way that the receiver may analyze and interpret based on the shared social and cultural contexts. Understanding that the sender of the message, or the designer, must arrive at a message to create a purpose for the apparel that the receiver, or consumer, is imperative to this research. The message encoded within apparel that promotes sustainability is one that is designed intentionally for longevity, to become part of the core wardrobe, and worn in a variety of ways is a product that is a higher price, quality, and value, not intended to be over-consumed. This apparel is designed to make the consumer apart of something more, a part of the aim for a sustainable future. These are the connotations that this research aims to anchor with sustainable design and production. These messages and connotations create a purpose that sustainably made apparel is apparel that is intentionally designed for life in a way that is timeless and immune to occurring and changing trends.

## Research Gap and Questions

Fast fashion has become a large sector of the apparel industry that operates on the cradle-to-grave lifecycle model. This has generated a "throw away" culture for consumers by producing trendy, cheap, seemingly disposable garments that can be easily replaced by another cheap “trendy” garment. This cycle has had a significant environmental impact that results in a never-ending vicious cycle of over producing insufficient, unethically, and poorly made apparel. It is time for a change in the way we design and produce apparel in the fashion industry. Limited scholarly research linking Cradle-to-Cradle apparel design and practice in the fashion sector exists. This research serves to address this gap by identifying the ideal practices that create a more sustainable future that connects the people, environment, and economy to rebuild an industry that is both environmentally and socially responsible.

RQ 1: How is C2C utilized in the fashion industry from a luxury fashion brand case perspective?

RQ 2: How does a fashion brand negotiate multiple design principles (design concept, sustainable materials and production, and color) when employing eco-design and minimalism design strategies when creating a new apparel line.

RQ3: What design strategies and practices can designer utilize to align with C2C when creating a capsule wardrobe apparel collection?

RQ4: How does the meaning of sustainability, through the lens of semiotics theory, become attached to apparel through the designers’ strategies and practices that are chosen during the design process.

# CHAPTER 3

# METHODS

Chapter 3 contains the following sections: (a) research design, (b) researcher's reflexivity, (c) the case study, (d) data collection, (e) data analysis, and (f) validation strategies.

## Research design

The purpose of this qualitative case study was to gain a deeper understanding of the methods to implement cradle-to-cradle apparel design for sustainable apparel design and production. A qualitative approach was chosen to conduct a case study to analyze the design process and production methods of a New York luxury fashion company that practices sustainable design and development. In turn, the finding of this study could give insights to other fashion brands in the hopes of improvement and change.

Qualitative research was most appropriate for this study as the aims are to further our understanding of complex issues associated with certain groups, individuals, and processes that focuses on the experiences of those associated with the research (Creswell & Poth, 2016). Qualitative research turns the world into a series of representations through different methods of data collection (Given, 2008). This research project was comprised of a product analysis and semi-structured interviews.

Further this study utilized a case study which is broadly defined as an in-depth examination of people or a group of people and valuable where broad, complex questions are being researched (Starman, 2013). Through a thorough review of literature, there is a lack of

design research surrounding C2CAD and methods to implement this design process in real world companies. Past design research has not incorporated both eco-design and minimalism to implement or successfully achieve C2CAD. Many studies related to C2CAD and sustainability have focused on approaches such as design for disassembly, or focused on specific sectors such as children's knitwear, or consumers perceptions. The choice of qualitative research was based on past studies, which conducted similar exploratory studies, conducted by Jalil and Shaharuddin, (2019), Gam, Cao, Farr, and Heine (2009), and Rumsey (2008). Implementing C2CAD methods by using eco-design and minimalist principles to an existing apparel design and production model follows the method used to create C2CAD by Gam, Cao, Farr, and Heine (2009).

## Researcher's reflexivity

Establishing the researcher's subjectivity has been established as a way for qualitative researchers to ensure the quality, rigor, and trustworthiness of their work (Dodgson, 2019). To increase the credibility of findings and deepen the researchers understanding of the work, a critical self-reflection must be performed by the researcher. This reflection is performed to further describe the effect of intersecting relationships and the impact of biases, beliefs, and personal experiences of their research (Berger, 2015). For this study, a subjectivity statement will allow the researcher to become more self-aware of the effects of potential bias in research as well as give the readers a more constructivist view by noticing and attending to bias and may evaluate the research accordingly (Watt, 2007).

I, the researcher, have had a deep, longstanding relationship with fashion and an awareness of environmental issues throughout my life, education, and work. In selecting my

research topic, I found my experiences and reflection of experiences to be enlightening and the key to what research I needed to do. I grew up believing finding a good deal on clothing was more important than the quality of clothing. My mother, a single, Caucasian, middle class woman, always gave me clothes and if I didn't like them, she always said that no one knows what brand it is or something about how I wouldn't like it in a month. Both hold some truth, as I was a growing child, however I knew what I liked. For me, the brand often didn't matter as much as I was unknowingly more focused on the aesthetic and physical durability.

I always had an eye for quality and sought pieces I would wear for years, during any season, and that would not go out of style. I enjoyed receiving hand-me-downs from my siblings, even if they did not fit, because I knew they had been worn and would withstand the test of time and many wears. My oldest item in my wardrobe is a red, Life is Good, tee shirt that belonged to my grandfather, that I developed a deep emotional connection for as well as physical connection, as it has gracefully aged into the softest fabric I have ever touched. Unknowingly, I look back and realize I was always looking for longevity in durable pieces and created emotional connections that would later foster my research.

I grew up in an American, middle class, single parent household. After I watched my single mother struggle to put clothes on mine and my sisters' growing backs, as well as her own, I always wondered about why we continually needed to replace moderately new clothing. It was not until I began studying fashion merchandising in undergrad that I began to understand why. Fast fashion practices and sustainability efforts were brought to my attention in classes, and I realized fast fashion was all I have ever known. Aside from hand-me-downs, my closet consisted of pieces from mall retailers or factory outlet stores that were infamous for their fast fashion practices and low-quality pieces – the answer to my questions about why our clothes did not last.

All my mother knew was how to provide to us clothing she could afford, and quality pieces came at a price that was beyond her reach and in turn, beyond her knowledge.

Growing up I admired all kinds of design – art, architecture, interiors, landscapes, engineering, graphics, and especially fashion. Even though I was surrounded by average, or below average, design I was inspired when I saw art in museums, curated interiors at my peers' houses, architecture, or beautiful clothes on television or social media. Growing up with less, I appreciated so much more. I always looked at things with a curious eye, wondering how things worked, admiring details and craftmanship and wondering about the intent of the design and its impact on those involved in the process.

I always knew I wanted to create something that people would treasure for a lifetime and through trial and error, I found a sense of continuity with fashion design. I found that so much of fashion is inspired by other design – architecture, interiors, etc. After receiving my Bachelor of Science at the University of Georgia in Fashion Merchandising with emphasis on product development and design I went to New York for an internship in design and product development with a luxury fashion house. I was inspired by their design process, product development, quality control, and most of all their sustainability efforts. Entering graduate school, they gave me an idea of what I wanted to study, something I was always interested in – the design process.

This company was chosen to research because of my experience working with the company for three months post undergrad, where I saw the design process and had hands on experience creating and producing responsible garments. As I worked closely with design and production teams, I gained a deeper understanding of the ins and outs of a luxury fashion company and with my education was able to identify the ways in which they designed and

produced in a sustainable manner. From working with design, I learned and participated in the design process begins, from inspiration, sketches, flat development and revisions, fabric selections, to fittings, spec, and alterations and with production I made factory visits and did thorough quality checking of each garment. I saw how they were able to create clothing that was intended to be kept for years, not losing aesthetic or physical value by being made carefully and intentionally to meet minimalist, timeless, and durable standards.

I recognize my bias in my personal knowledge and opinions of issues that exist surrounding sustainably made apparel and how that might affect my lived experience working with the case as I was unable to afford sustainable apparel growing up. This bias could affect how I perceive the beauty of it all, however, with my acquired knowledge and previous experiences, I can recognize this case and their practices as being a sustainable process that holds great value for research. Their goal is to create timeless, quality, functional apparel while making conscious efforts to design and produce responsibly, which is the backbone and inspiration of this research.

## The Case Study

A case study approach was utilized for this research as the chosen case has both individuals and a group of people that are knowledgeable to examine in relation to sustainable apparel design processes. This case study was valuable to sustainable design research thorough description and analysis of the case and with the purpose to identify variables, structures, forms, and orders of interactions between the group of people and to assess the performance of work and progress in development (Starman, 2013).

The company, referred to as MONO for privacy, was a deemed an appropriate case for analysis as it operates by minimizing their relationships to acquire quality, local relationships with the components of their integrated design and production process. With their integrated design approach, MONO enhances interconnectivity between the local components of design, production, and manufacturing. By placing importance of collaborative efforts with suppliers to create the desired final product of the highest quality, MONO closely develops and maintains relationship throughout their supply chain, which successfully achieves the intelligent materials pooling, described in McDonough and colleagues (2003) cradle-to-cradle research described above. This is critical to implementing C2CAD as these relationships enhance sustainable goals by providing knowledge, skills, and solutions to design and production problems (McDonough et al., 2003). Along with their integrated approach, MONO, a New York City luxury fashion company, has a foundation of slow fashion, multifunctionality, and stylized minimalism. This is imperative to identifying key elements of design and development processes that promote C2CAD, as well as identifying and implementing any areas for improvement and change to the existing design and production model used by the case.

## Data Collection

In order to strengthen the design and outcomes of this study, multiple sources of data generation was used to study the phenomena using the following for data collection: (a) semi-structured in-depth interviews, (b) product line analysis (c) supporting documents. After IRB approval, targeted participants were sent an email recruitment soliciting their involvement in the study and informing them of the requirements to participate. The researcher conducted four video call interviews during the most convenient time specified for the participants in February

and March of 2023. The interviews were 60-80 minutes in length and were all audio-recorded. In addition, jot notes were captured to help in the product line analysis. Before beginning the interview, all participants gave verbal consent to participating and being recorded.

### *Semi-Structured In-Depth Interviews*

According to Roulston: "we can envision interviewers who position themselves as co-constructors of knowledge, striving to develop collaborative relationships with interviewees to initiate some form of social change" (Roulston, 2010, p. 224, para. 3). Semi-structured interviews utilize questions in the form of open, rather than closed questions, which reflects a neo-positivist conception of qualitative interviews, with the findings displayed in the "form of themes supported by extracts from interview transcripts" (Roulston, 2010, p. 217, para. 1). Interview data is commonly coded and categorized to display themes arising within interviews that provides accounts from individuals and groups to generate substansive theories concerning research topics (Roulston, 2010). According to Roulston, when using a neo-positivist approach to interviews, an interviewer

> asks good questions, while carefully minimizing bias and researcher influences through taking a neutral role. By taking this approach in the interview interaction, it is thought that quality data will be generated from which valid findings may be produced (Roulston, 2010, p. 204, para. 3).

Structured interviews are designed to contain standardized, closed questions that provide specific answers for the data to be analyzed, therefore this research uses semi-structured, open questions as it often provides richer answers regarding the participants beliefs, perspectives, opinions, and attitudes concerning the research topic (Roulston, 2010). With a neo-positivist approach, semi-structured interviews are deemed the most appropriate interview strategy to

collect data for this case study because the semi-structured, open questions allow the participant to feel, judge, remember, and make sense of their lived experience. According to Roulston, 2010:

> establishing the truth and accuracy of reports provided by participants is of paramount concern, along with showing how the researcher has minimized his/her influence on the generation of data (Roulston, 2010, p. 217, para. 2).

Therefore, to approach concerns surrounding accuracy and quality of data generated through interviews, this research establishes credibility through showing how the participants were a reliable source by providing demographic data in table 3.1, as well as comparing responses across interviews to corroborate findings (Roulston, 2010). The credibility of findings is also established by demonstrating how the researcher has gathered sufficient information in field work by using "multiple data sources and checking interpretations with sources" through comparisons across all methods of collection (Roulston, 2010, p. 217, para. 2). The researcher establishes credibility as a reliable and accurate witness also by providing the researchers reflexivity. Credibility was established within the data collection process by conducting semi-structured in-depth interviews with reliable witnesses to provide accurate accounts (Roulston, 2010). Semi-structured in-depth interviews were held with the founder, designer, and creative director of the company as well as the former assistant designer, the production manager, and production assistant. Table 3.1 below outlines the study's participants' demographic characteristics.

**Table 3.1**

*Demographic Characteristics of Participants*

| Participant Pseudonym | Title at MONO | Age | Years in Industry | Experience in Fashion Industry |
|---|---|---|---|---|
| CD | Founder, Creative Director, Head Designer | 40 | ~20 years<br>MONO (10+YRS)<br>2013-2016 large retailers<br>2016-present bespoke, made to measure, atelier | • PR Consulting<br>• Production<br>• Design<br>• Product Development<br>• Pattern Making<br>• Entrepreneur: MONO |
| FAD | Former Assistant Designer | 25 | 4 years (excluding internships in college) | • Production<br>• Product Development<br>• Design |
| PM | Production Manager | 27 | 3 years | • Manufacturing<br>• Production |
| PA | Production and Product Development Assistant | 23 | 4 years (including jobs and internships in college) | • Sales/Retail<br>• Styling<br>• Wholesale<br>• Production |

## Interview Instrument

An interview guide (appendix A) was created to conduct the semi-structured interviews, starting with a series of pre-planned, generalized, broad open-ended questions related to the overall research that the participant is knowledgeable in (DeJonckheere & Vaughn, 2019). These types of questions are referred to by DeJonckheere & Vaughn (2019) as the grand tour. The more broad, open-ended core questions can usually be separated into sections, and followed by probing questions which are questions to gain a deeper understanding of the broader questions

responses that directly relate to the research. The guide also included planned follow-up questions, which ask for detail on the core or probing questions depending on the dialogue between the interviewer and participant (DiCicco-Bloom & Crabtree, 2006). Then there are unplanned follow-up questions that arise during the interview based on participants' responses. The follow-up questions are equally important as the core and probing questions as they allow the participant to go deeper and elicit more details to further understand the topic (DeJonckheere & Vaughn, 2019).

### *Product Line Analysis*

In this study, a product line analysis was conducted of apparel from a luxury minimalist brand, MONO. The product line analysis studied the Fall/Winter 2022 collection, through collecting the product line data from questions in the interview, analyzed the data through descriptive analysis, as well as analyzing the line in terms of visual appearance in accordance with the design structure, minimalist features, and eco-design elements. The company's mobile website was analyzed as well as social media to gather information regarding the designs, materials, and recommended styles to further analyze their use of eco-design and minimalist principles in the collection. This assisted in understanding the meanings the case attaches to their collections through storytelling, inspiration, designer notes, fabric guides, and other relevant information. This served as a tool to discover how the meaning or notion of sustainability is attached to designs that promotes longevity, emotional connections, and further adds quality to the pieces.

Tables 3.2-3.3 were used to collect data for a product line analysis of garment pieces identified by the participants as those capturing the values of MONO from the core collection,

and the Fall/Winter 2022 Collection. Each collection was assessed based on eco-design and minimalist principles and rated one-through four in each category for conceptual design, sustainable materials, and color choices. All items identified by participant responses were analyzed from both collections in relation to eco-design and minimalist qualities according to the qualities and traits discovered during the literature review as well as qualities revealed from interview data. For both eco-design and minimalism, shown in tables 3.2 and 3.3, conceptual design, sustainable materials and color are the three categories that was assessed. Each of these categories was assessed on the qualities each piece reflects, displayed in tables 3.2.1 and 3.3.1. Table 3.2.1 displays eco-design rating for conceptual design based on the transitional, functional components, and ergonomic comfort of each piece, the sustainable materials evaluated by the items description and fabric guide as well as interviews to assess the circularity, durability, and use of mono-materials. Last, the color choices were rated according to their neutrality, natural colorways, and versatility. Each of these sections will contain further information regarding these qualities, revealed in the interviews, to accurately rate the items in the product line analysis.

For minimalism, shown in table 3.3, each component was rated on the same conceptual design, sustainable materials, and color choices. Table 3.3.1 describes the characteristics of each rating for minimalism, starting with the conceptual design, which was assessed on the silhouette, functional components, and ergonomic comfort. The sustainable materials were assessed according to mono-material usage, modular design and proportions, and fabric manipulations and interesting details. Lastly, minimalism color choices, were assessed over the neutrality, minimal colorways, and versatility. In addition, each of these sections gave further information regarding these qualities, revealed in the interviews, to accurately rate the items in the product

line analysis. For both eco-design and minimalist scores, each item was totaled with the scores from each section and combined.

**Table 3.2**

*Analysis of eco-design elements used in product line development at MONO*

| | Eco-Design Ratings: X Collection | | | |
|---|---|---|---|---|
| | (a) Conceptual design | (b) Sustainable materials | (c) Color choices | total |
| item | | | | |
| item | | | | |
| item | | | | |

**Table 3.2.1**

*Descriptors of rated (1-4) qualities for eco-design (a-c) of table 3.2*

| | Conceptual design | | Sustainable materials | | Color choices |
|---|---|---|---|---|---|
| - | Transitional | - | Circular fibers | - | Neutrality |
| - | Functional | - | Durable fibers | - | Natural colorways |
| - | Ergonomic comfort | - | Mono-material | - | Versatility |

**Table 3.3**

*Analysis of minimalist elements used in product line development at MONO*

| | Minimalist Ratings: X Collection | | | |
|---|---|---|---|---|
| | (d) Conceptual design | (e) Sustainable materials | (f) Color choices | total |
| item | | | | |
| item | | | | |
| item | | | | |

**Table 3.3.1**

*Descriptors of rated (1-4) qualities for minimalism (d-f) of table 3.3*

| Conceptual design | Sustainable materials | Color choices |
|---|---|---|
| - Silhouette | - Mono-material | - Neutrality |
| - Functional | - Modular design and proportions | - Minimal colorways |
| - Ergonomic comfort | - Fabric manipulation and interesting details | - Versatility |

## Data Analysis

After the data was collected from interviews and product analysis, the recorded audio was saved on the researcher's personal computer and interviews were transcribed by Otter.AI and saved as Word Documents. Since transcribing interviews can be a lengthy process, the researcher used two platforms to transcribe, Otter.AI and Trint, and then checked the automated transcriptions for accuracy by manually transcribing by the researcher. All transcriptions were

downloaded and saved on the researcher's personal computer in Microsoft Word and then double checked. In addition, jot notes were added to the transcripts. Throughout analysis, the researcher began to piece together concepts and emerging themes within the interviews and product line analysis through constant comparative analysis (CCA). Constant comparative analysis (CCA) was employed with the goal of discerning conceptual similarities within the interviews, product line analysis, and research to further develop categories and discover patterns within the findings (Fram, 2013).

The first step of CCA for this research was to code each interview with sub themes. During this step, the analysis was systematically organized to reduce the data into categories that identify patterns (Fram, 2013). The second step was a comparison within the interview to identify themes within singular interviews. The third step was a comparison across all interviews to find similarities of themes. The fourth step was utilizing the product line analysis as a supportive document of the themes identified within the interviews. Utilizing the connections found in step four, the fifth step was an interactive process of CCA to categorize and delineate connections and themes across both methods.

## Validation Strategies

The following validation strategies were utilized to ensure validity in this study (a) triangulation, (b) low inference descriptors, and (c) reflexivity.

The validation strategy of triangulation was used for this research, utilizing multiple methods to explore research questions in measuring the subject of interest and ensuring the quality of research (Roulston, 2010). Using more than one research method enables the researchers the ability to zero-in on the information sought by providing several forms of results to be compared and analyzed for the most accurate results and quality findings (Freeman et al.,

2007). Along with providing a strategy that helps navigate the research questions and results, triangulation aims to test validity through cross-checking information and corroborating themes identified throughout data collection and different sources of information (Carter, 1969). Triangulation also provides validity through identifying potential bias by combining several methods, as opposed to one, allows the researcher to analyze the results more accurately by capitalizing on individual strengths of each method (Freeman et al., 2007).

Next, low inference descriptors were used to ensure details and variations within the data collected from interviews and product line analysis. This strategy involves using descriptions phrased closely to the participants' answers during interviews, such as verbatim (i.e. direct quotes) (Johnson, 1997). This strategy used participant descriptions from interviews to describe details and combine with data from other platforms during the product line analysis to identify shared characteristics to provide accurate, quality data. Using low inference descriptors also served to identify patterns arising within interviews and then used to compare patterns across all interviews and identity themes. When compiling a research report, using many low inference descriptors have been found to be useful for the reader to further understand the meanings and personal experiences of the participants (Johnson, 1997).

Due to the researcher's former close contact with participants, a reflexive practice was used as a validation strategy to ensure the researchers reliability, rigor, and trustworthiness (Freeman et al., 2007). To ensure trustworthiness and reliability of the researcher, a subjectivity statement was provided to give further insight regarding the researcher's experience. Having a reflexive researcher that was "aware of their subjective positions in relation to the research participants" was critical to the validity and reliability of the research (Roulston, 2010, p. 2018, para. 2). Providing insight to the researchers lived experience with the participants within the

company of the case study provided valuable insights as well as potential biases that may affect the research process. Reflexive strategies such as reflection and self-awareness of the researcher's relation to the research was critical to the validity. Since the researcher had a lived experience working with MONO, personal ties, and bias, the researcher was able to identify strong correlations practices to sustainability and make connections within this research that would have otherwise not been possible. Reflexivity was important to serve as a validation strategy to provide the reader with an understanding of how it could have affected the study.

# CHAPTER 4

# FINDINGS

Chapter 4 contains the following sections: (a) interview analysis, (b) intention and purpose as a value system, (c) intentional design and production, (d) creating and connecting a community through relationships, (e) product line analysis, (f) product line analysis: core collection, and (g) product line analysis: F/W 2022 seasonal collection.

## Interview Analysis

Interpretation of the study's data revealed three overarching ideas that were drawn directly from participants' own words throughout each interview and across all interviews: intentionality, relationships, and connection. Each section below serves to better understand MONO's system, processes, relationships, and answering researchers' questions. Research question #1 asked *How is C2C utilized in the fashion industry from a luxury fashion brand case perspective?* The first theme category reveals the answer through "Intention and Purpose as a Value System" with the sub-themes of (a) design discipline, (b) architectural studio mentality, (c) slow fashion, and (d) rearview innovation. Research question #2 asked *How does a fashion brand negotiate multiple design principles (design concept, sustainable materials and production, and color) when employing eco-design and minimalism design strategies when creating a new apparel line*? The second theme category helps in answering this with "Intentional Design and Production" along with the sub-themes (a) intentional inspiration, (b) intentional material selection, (c) intentional color selection, (d) intentional construction for

functionality and (e) intentional production. Research question #3 asked *What design strategies and practices can designers utilize to align with C2C when creating a capsule wardrobe apparel pieces?* Theme category number three, helps answering this through "Creating and Connecting a Community through Relationships" and the sub-themes (a) connection with the supply chain, (b) connection through trunk shows and (c) connection through education. Finally, Research question #4 asked *How does the meaning of sustainability, through the lens of semiotics theory, become attached to apparel through the designers strategies and practices that are chosen during the design process*? Which is answered by looking at this research through the lens of semiotics theory, discovering the intention and meanings attached to the apparel revealed in theme category number two "Intentional Design and Production," as well as the purpose created from this meaning which is revealed by the result of theme category number three, theme category number four "Connecting a Community within the Value System" and the sub-theme (a) people and product and (b) product and value.

## Intention and Purpose as a Value System

In exploring the mission and core values of MONO, as well as the design and production processes, results of the data analysis revealed intention and purpose as a distinct, reoccurring theme category. Intention was used in a variety of ways to describe many design characteristics, production processes, and ultimately the core value of the company. As defined by the Merriam-Webster dictionary, intention implies what one has in mind to do or bring about (Merriam-Webster.com Dictionary, n.d.). Conceptually, intention is a concept considered as the product of attention directed to an object of knowledge (Merriam-Webster.com Dictionary, n.d.). Intention closely relates to purpose, defined as something set up as an object or end to be attained

(Merriam-Webster.com Dictionary, n.d.). In reviewing the data, both intention and purpose was found as an interchangeable descriptor for the mindset behind the core values, thoughtful designs, and production processes of MONO.

Beginning with the foundation of all practices are the core values, or the four pillars of MONO: design discipline, architectural studio mentality, slow fashion, and rearview innovation. The creative director and head designer, CD for anonymity, provided key insights into these pillars.

**Core value: Design discipline**

The first pillar, *design discipline*, is seen in each component of their creations, from the studio to the collections, and CD says that the design discipline is "all about the product and the multifunctionality of the product, that is our design ethos, that is the value system." This is seen in how the designs (and operations) each are seamlessly integrated to allow for functionality, efficiency, and connection. Mono's design discipline is displayed through intentional design and production methods to reach multi-form designs for multifunctionality, which means their pieces are thoughtfully designed to maximize uses. CD says that design discipline "allows the convertibility and the reversibility of the product really allows flexibility for the wearer and also, other than the sleek, modernist look, it allows the client to really live in their clothes through functionality." This is achieved through intentional designs, many capable of multiple forms, that can be transformed for personalized, transitional styles, creating many ways to style for the wearer. This is a foundational notion within the designs, rooted in architecture, to "make pieces that could be worn, each in many variations, and together in a series of alternative and creative ways to fit the unique functional and aesthetic needs of modern women." This concept allows a certain personalization for clients while adding value to the products, CD describes it as "buy 1

piece and wear it in 3 ways." Design discipline aims to utilize technically developed mechanisms for reversibility and convertibility, advanced fabrics to support this discipline, and integrability via a modernist aesthetic, consistent across collections.

**Core value: Architectural studio mentality.**

The second pillar, *architectural studio mentality*, serves to create an ongoing, deep level of dialogue and understanding with each client, while digging into the programmatic needs of each client. CD explains that at MONO they "are directly connected and always want to know and learn with our clients and from our clients." This means listening and understanding the needs communicated by individual clients and providing personalized solutions to fit their needs. It is seen through the studio's technical capacity, aesthetic coherence, concept driven, and client dialogue to lead to an understanding of needs. CD explains that the basis of having an architecture mentality means:

> "It is all about really providing a quality product that it's all about the user, meaning our client, to really feel perfectly connected themselves into the product, as well as, you know, in architecture, it's like feeling safe within your environment, I would say in clothing, it's feeling comfort and functionality."

This personalized practice is rooted in MONO's architecture mentality, as it is critical for their process, to achieve the functionality rooted in design discipline, as well as to have communication with clients which allows designers to help educate and articulate those needs in drawing and development of solutions. CD explains that this connection created through meeting these needs allows for a feeling of comfort and functionality which then translates into a form of "protection" for the client, like that of safety felt in architecture.

**Core value: Slow fashion**

The third pillar, *slow fashion*, translates to the minimization of layers or middle people, while maximizing direct relationships with mills in Japan, tanneries in Europe, factories only in NYC's garment district, and direct client relationships. CD explains her beliefs surrounding sustainability, stating that she "does not like to use that word [sustainability], because it's so overused and it's almost a marketing term even when it's not necessarily true or not executing the meaning that [sustainability] intends." CD explains that they talk about the idea of sustainability through "thoughtful, meaningful design and execution." She explains that their fourth pillar, slow fashion, is achieved through:

> "thoughtful product development and production of our product, which, you know, ultimately manifests in a sense of sustainability, where we really are directly connected to both the making, we know every single person along the way who's making the product, so there's less middlemen."

MONO ensures this as they have direct, personal communication with each member of the process, so each person understands the goal and product fully. She also explains that this direct relationship allows MONO to ensure their collaborators are taken care of as "when you have less in between people, you can really know what we pay, what we pay who, and that it's that it's a sustainable wage, and that everything we do is to make sure that everybody who works with us is doing well within the process." This care for their people shows through their products, as these quality relationships translates into quality garments. CD explains that this is critical because, at MONO:

> "At the end of the day, everyone is our collaborator, and our partner, versus anyone sort of working for us to do like one part of the process. And as far as clientele goes, that sustainability is that we're building a community of people who also require a certain level of product quality."

This pillar directly stems from the architectural studio mentality, that aims to cultivate relationships that allow for constant communication, to understand needs and designs to meet these needs. By having close relationships with collaborators, MONO can achieve the "intelligent materials pooling" outlined by McDonough and Braungart's (2003) research which is critical to implementing C2CAD.

**Core value: Rearview innovation**

The fourth pillar, *rearview innovation*, serves as the modern copy of the atelier concept that is MONO's studio and collections. Their studio was designed to connect the myriad of architectural elements that reflect their values (creative materials, custom built-in functions, and the inter-relatability of spaces) to result in a modern copy of the atelier concept with the belief that well designed spaces are meant to be well activated for productivity, hospitality, exhibition, and social mingling. These elements that were employed in the creation of the studio, are the same elements utilized in creation of their collections. These elements also are meant to serve the same purposes – pieces that, according to CD, "are made to be lived in, and worn in many ways" the same as the studio is meant to be lived in and utilized in many ways. This pillar is also seen as the company aims to achieve this functionality by not pretending to create radical newness, which results in flipping the social media script to create a studio mediated experience with product-based purposefulness. Product based purposefulness means that, at MONO, they hold their values and beliefs close, to relate to and express their brand identity at its core, which a

modernist, multi-functional, stylized minimalism brand. According to CD, this means looking at designs through the lens of a product designer, one that takes previous designs and finds new ways to innovate the designs to be more functional and maximize usage for the user.

In an interview with the former assistant designer/production manager, FAD for anonymity, this was a belief that was employed with intention and care. The core values at MONO, according to FAD, were reflected in the "emphasis on the quality of the garments" and something that was "incredibly special that they [MONO] do" compared to her new job at a larger luxury fashion company. After working in a larger company, she explains how different the process is compared to MONO, and that the attention to detail and quality of each piece is rare. FAD explains that at MONO "Every piece must be literally the best it can be, because it is an expensive garment, but it's also built to last." She says that she believes that execution of quality is one of "the biggest things in a sustainable practice" and is achieved through being intentional with design and production practices. FAD explains that at MONO,

> "I feel like one of the things of designing with intention was also looking back at what we had done previously and what was successful. I think a lot of designers would just be like new, new, new, and then it's like, you lose yourself in that, and you lose your brand identity and that very quickly. Because when there's so many new things all the time, that's great, but actually not really great because you do lose your customer. And you lose the woman that you're designing for."

This means they are not trend based, producing new, unrecognizable collections – each collection is a variation of previous, successful designs that they update with slight pattern adjustments and new, innovative materials. As many companies go to a blank drawing board each season, MONO looks at their previous collection for inspiration and ideas, like product

designers, to create pieces that are true to their brand, values, and beliefs. This practice aligns with Guedes and Buest's semiotic state of fashion design, through utilizing semiotics as a reflective process (imaginative), as they have created intentional collections that contain pieces that are valuable to developing future collections that remain cohesive to the nature of the brand. Through this practice, MONO explores design using semiotics as a reflective process, through "observation, interpretation, and the development of a lexicon of knowledge" of the signs, and have developed not one concrete solution, but a resource for future projects (Guedes and Buest, 2018, p. 204, para. 1). FAD explains that each year, MONO "evolves and grows and it gets like cooler and better, but if you look at it now, and then you also look at it six years ago, you can tell that it's the same company." This intentional practice of evolving previously successful pieces allows MONO to be consistent, to meet and often exceed the clients' expectations, practicing semiotics as a prospective process (anticipatory) that anticipates client's needs, which is critical to emulating this modern atelier environment. Through practicing semiotics as a prospective process (anticipatory), MONO designs collections with the clients in mind, which is key to being true to the core values and to creating pieces that may be "built for a lifetime and passed down" which FAD explains is the biggest value MONO creates. Through semiotics as a prospective process (anticipatory), MONO identifies consumers expectations of their designs, predicting those to be wearers that interpret their designs as timeless, valuable, quality pieces to connect with, identify with, resulting in an heirloom to be passed down (Guedes and Buest, 2018).

A synthesizing quote from the product analysis in an interview article from the F/W 2022 seasonal collection, where CD explains her purpose is that:

> "I aim to conceive, design, develop, communicate, and sell our pieces to a community of women who will use each look as a point of communicative power. We design for "her,"

> to help her reach her unique personal and professional objectives. I am in this world in the service of and development of productive aesthetics, each piece to be used meaningfully and joyfully."

CD expresses how she aims to create pieces for a community of women, to utilize as a point of communication, directly ties back to the C2CAD model outlined by Gam and colleagues (2009) that emphasizes sustainability as well as functional, expressive, and aesthetic characteristics (FEA model). The core values of MONO "to conceive, design, develop" are those that fully align with C2CAD values, which are further seen in the interview analysis, as well as the FEA model, to create functional pieces in term of utility, durability, reversibility, multi-functionality, and multiple end uses, eco-design in terms of materials, longevity, and functionality, and minimalism in terms of design, production, construction, and form. She goes on to say "communicate, and sell our pieces to a community of women" which again aligns with their architecture studio mentality as well as the C2CAD model. As MONO intentionally develops close connections and relationships, allows them to define problems, analyze their market, identify and research user needs based on the FEA model (Lamb and Kallal, 1992), and develop solutions – all parts of step one of C2CAD model outlined by Gam and colleagues (2009). This also aligns with Guedes and Buest's (2018) research as MONO utilizes semiotics as an encoding-decoding process (communicational) to allow the communicational aspects present within the tools and processes during the planning phases of design, such as mood boards, prototypes, technical patterns, to become encoded into the design. This encoding process supports the communicative relationship between MONO and the clients that creates the dialogue with clients which leads to interpretations of the signifiers that create the meanings behind design (Guedes and Buest, 2018). Following the community of women, she says she designs for, she says they "will use each look

as a point of communicative power." This statement reflects semiotics as an encoding-decoding process (communicational) in relation to the wearer, as CD indicates that the design is a point of communicative power to reach the wearers objectives. This is the essence of semiotics, that when captured through design, is used as a communicative tool to share, or conceal the wearers aspirations, expectations, desires, or state of mind (Guedes and Buest, 2018, p. 207, para. 1). This statement packs in many meanings, which through the lens of semiotics, can be unpacked further by the interview analysis below.

## Intentional Design and Production

According to the Merriam-Webster Dictionary, design implies a more carefully calculated plan (Merriam-Webster.com Dictionary, n.d.). MONO has a design system that is rooted in creating pieces that can be worn in many ways, with countless style variations, for any season, for all of time because it is made with care and intention and not based on trend. CD explains that for MONO, there is emphasis on creating timelessness through quality but also through "good design is not based on trend, good design, is really creating, like, thoughtful product that has a concept." MONO designs are relatively rare and very different than those of other luxury companies, as FAD explained, because they hold true to the definition of design, they are intentionally made from a carefully calculated plan, from beginning to fruition, with several processes post-sale for clients to ensure quality and prolong the life of any of their pieces.

### Intentional Inspiration

Beginning with selecting the inspiration of a collection, MONO often finds inspiration stemming from an art movement, architecture, or mixture of both. Intentionality is seen from the start of the process for each collection, beginning with the inspiration of each collection. As CD

explains, that they are not trend driven, they turn to their inspiration to find ways to emulate elements of it in the designs in a modern, functional, minimalist fashion. Therefore, the inspiration for each collection is carefully selected to be one that emulates the pillars and values of the company. CD explains the importance of inspiration behind each collection and the added value behind the pieces being well-made and timeless as "I think that every single collection and done has its own story, its own inspiration. And the journey of making that collection was so incredible." This statement exemplifies several of the semiotic processes outlined by Guedes and Buest (2018), but most clearly it reflects how they address design according to semiotics as uncertain process (open project). Through intentional designs that emulate modern, functional, minimalist fashion, MONO 'prospers' in uncertainty by creating their own certainty – that is conceiving, creating, and designing pieces that are immune to the dynamic changes of the fashion industry (Guedes and Buest, 2018). This is accomplished by selecting intentional inspiration, analyzing the inspiration, and identifying meanings within that coincide with their core values. This practice entails the use of MONO's anticipatory, future-oriented mindset, that is deeply rooted within their values to create meaning behind their designs that signify the innovative, modern, quality, timeless mindset. This notion is key to their whole process of design, production, and overall business model, because, as they are not trend based, their pieces do not go on sale after a season is over because CD says "We don't consider, if an if a season is over, those clothes are considered to be like old or sale items, as if they were outdated, like as if they were to go and die. And like, for us, I believe just the opposite." This is why each collections inspiration is very intentional, and each design is well thought-out, and production is thorough, because these pieces are so carefully made to be the highest quality and timeless so

that they do not become “outdated” or sale items that have lost their value, their meaning, and ultimately their purpose.

The season analyzed in this research, F/W 2022 collection, inspired by Charlotte Perriand, is a collection that is fundamentally rooted in their four pillars and beliefs. Perriand was an influential product designer and environmentally conscious architect that aimed to create functional spaces. Which matches MONO values, as they aim to look at collections through the lens of product designers, making small innovations to change the usage and create added functionality. This aim to create functional spaces was a fundamental part of her belief system that better design helps to create a better society. In her article "L'Art de Vivre" (1981), Perriand states "The extension of the art of dwelling is the art of living — living in harmony with man's deepest drives and with his adopted or fabricated environment." This belief is captured and emulated through the design and production process seen in MONO’s F/W 2022 collection through conscious decisions to make pieces functional yet beautiful, as well as harmonious with nature in form and construction.

**Intentional Material Selection**

A former assistant designer/production manager, FAD, gave a plethora of insight into the inspiration and how it translated into the design and production elements of the season. She explains that instead of turning to construction trends, at MONO they “looked at some like menswear design, because we like the details of menswear clothing, but it was never like to chase a trend of the time. We wanted these pieces to make sense for like the brand but also like forever truly.” This process of looking to menswear for construction and other design elements translates to pieces that are better quality and timeless, as much of menswear is well-constructed and not trend based. As far as the inspiration for F/W 22, according to FAD, “I feel like she

[Perriand] was very conscious of how to make a beautifully designed piece or like a piece of architecture, but also to be very conscious of it being well incorporated with the surroundings and so it fit in well." This is a key takeaway for MONO's collection and rings true to their values, to create beautiful pieces, that blend well with the surroundings. This notion emulates the core values, by not creating radical newness – this allows them to create pieces and whole collections that are beautiful and cohesive so that they blend well with the surroundings (the core collection, previous collections, and non-MONO pieces). This idea, stemming from the inspiration of Perriand, holds true to MONO's core values as well as the recognizable brand identity they have built over time. According to FAD:

> "She [Perriand] also had a very big focus on like, using organic materials, like tree trunks or wood and using different textures that are like plant based or like, trees, things like that, too. So, we were trying to also incorporate that into the collection as well, using different interesting textures, but also just like, trying to incorporate it into the environment in a way like using things that like maybe resemble certain things from nature or the environment."

From the interview with FAD, it is understood how they utilize semiotics as a reflective process (imaginative) through the inspiration, in this case Perriand, to find ways to reflect the signs interpreted by her designs that inspire new ideas for MONO's designs – such as incorporating interesting textures, as well as finding ways to make the pieces resemble elements of nature and are conscious of the environment (Guedes and Buest, 2018) . This can be seen in the design and production practices used by MONO in several ways in this collection, one coat was identified by FAD that they created with innovative, eco-design materials. FAD explains that this coat was a puffer coat made from "recycled pieces of like down" that were collected from down waste and

“pressed into thin down sheets.” She explains also that this material was “more functional for the human body”, as “when you wear down, you get very like overheated, but this was made to be breathable.” She explains that this puffer was revived, as MONO attempted to make one in years prior, but it did not meet their standards and therefore, it was not produced. This strategy follows closely to their values, that as product designers they aim to make innovations to make pieces functional or not at all. Being intentional with design to create collections that are true to the brands identity and heritage to meet client expectations also means being intentional with material selections to meet the level of quality expected as well as being environmentally conscious. Every fabric used at MONO is research and carefully selected to ensure that it is coming from the best, most ethical source. CD explains that “with every collection, we're researching and studying more about, like, really, truly working on selecting fabrics that are either **sustainable**, or are or are **recycled**.” This statement reflects the usage of semiotics as uncertain process (open project), as she indicates that the design process of each collection is inherently fluid and evolving as they research new sustainable materials each season to utilize the industry’s fast-paced, dynamic conditions. As semiotics as uncertain process (open project) focuses on planning an approach to accommodate change and uncertainty, MONO plans to spend time researching these changes each season to incorporate new materials that signify a particular mindset that is susceptible to change – hence evolving views of sustainability for consumers reflects evolving solutions to be reinterpreted by the wearer. Many of the materials MONO utilizes, according to CD are:

> “recycled polyesters, like the tech fabrics or, for example, we've used **organic cotton's** that are **dyed with plants**, so that they're not chemical died. And then also just, for

example, our leathers, and our shillings are all a byproduct of the food industry, and so they're part of the whole system, the whole **ecosystem.**"

They aim to be conscious of the environment, like Perriand, through a practice of semiotics as a reflective process (imaginative) in everything they do. This can be seen in MONO's observation and reflection on what has been materialized within inspiration derived from Perriand, such as her designs being well incorporated with nature, and how to reflect these meanings within the collection, seen one way through the materials dyed from natural sources such as plants, to signify nature .

MONO signifies nature using semiotics as an encoding-decoding process (communicational) in every collection, as well as in their core pieces, by utilizing leather that is a by-product of the meat industry. This shows how MONO uses designs as a communicative tool to express a state of mind within a sociocultural context (Guedes and Buest, 2018). The communicational tool is present both in the tangible clothing (high quality, by-product leather) and intangible meanings communicated (sustainability, durability, longevity). This practice reflects the nature and the ecosystem of the world as they utilize a product of a constantly producing industry, the meat industry. They are utilizing the skin of an animal which otherwise would become more waste. Here is where another theme can be seen in the research, creating ecosystems, which is further discussed later. Along with utilizing an asset that would otherwise be seen as waste, CD explains that they "pay a premium" for their skins, as they only work with French mills and tanneries that "provide high quality materials" and are held to the highest standards. CD says that these French mills and tanneries they select to work with are held to "French laws on how the tanneries can treat the skins from their origin, and how they work with their dyes, and how they throw out their dyes, they have such a strict rigorous law system." This

strategy also reflects semiotics as uncertain process (open project), as MONO states they "pay a premium" for "high quality materials" that are held to the perceived "strict rigorous law." This statement shows how MONO addresses the uncertainty involved with the 'how will I be seen' notion of semiotics as uncertain process (open project) according to Guedes and Buest's research (Guedes and Buest, 2018, p.206, para. 2). 'How will I be seen' reflects the uncertainty for both the company and the wearer through this statement. It reflects how MONO adapts and molds how they will be seen by consumers, through researching suppliers, interpreting the laws and regulations of suppliers, paying a premium and evaluating the high-quality materials. This reflects MONO's acknowledgment of 'how will I be seen' through their research of quality and sustainability of suppliers, product, and company. This reflects 'how will I be seen' for the wearer as well, by designing a piece made of the perceived highest quality, ethical skin, which then will be interpreted by the wearer and worn to communicate their views, status, and beliefs (Guedes and Buest, 2018).

Utilizing semiotics as uncertain process (open project) creates an "anticipative future-oriented mindset" which is necessary for 'prospering' in uncertainty, allowing designers to practice semiotics as a prospective process (Guedes and Buest, 2018, p.206, para. 3). By researching their suppliers, they are anticipating the mindset of the consumer that seeks the highest quality, timeless design. CD explains that this level of quality also translates to the physical timelessness of the materials to ensure they are the highest quality that will withstand the test of time. This notion is both "predicative and proactive," which reflects semiotics as a prospective process (anticipatory), as MONO predicts the wearer's mindset that, they expect to remain stagnant and immune to the state of flux of fashion cycles because MONO is proactive utilizing minimal design and quality materials to make designs timeless and the highest quality,

made to withstand the test of time. CD explains that this quality and timelessness they design for is part of their minimalist beliefs that “timeless clothing actually, physically also means high quality, so we've always been about buy less, but buy of quality.” This intentional practice is seen throughout interviews, across many components of their process, to buy less but buy quality, to produce less but produce quality. Fabrics and materials are held to certain standards and undergo unique tests to ensure that any new fabric and material, such as the puffer materials, continues to meet the level of quality they require for each piece. CD explains a few of the different tests she performs to test the fabric for movement, comfort, shape retention, and durability when selecting materials. She says that testing for movement is critical because “making sure like to me fabrics must move, so if the fabric doesn't have at least some natural stretch, it's going to be very tough for the wearer to really feel ultimate comfort. So, I'm always kind of tugging and pulling on the fabrics.” After she tests the fabrics for movement and comfort by tugging and pulling, the next test is visual by seeing how the return of the fabric is, CD explains:

> “Meaning like when you stretch it, does it stay stretched out? Or does it come back to itself? And that's very important, because then there's nothing worse than wearing a pair of pants or a garment where the elbows or the knees are stretching out, and that just doesn't look sleek, and it's very hard to put that shape back together. And the garment, and the look becomes sloppy very quickly.”

This test is very important to the functionality, as they anticipate their pieces to be easily worn and lived in, therefore they must be high quality fabrics that retain their shape and their look over many wears. The final test is for the fabric’s durability, where CD says she “will take off one of

my rings, or even like kind of use one of my bracelets and kind of do the snag tests." This is another critical component of the fabrics quality as she explains:

> "So, if the fabric is like, extremely gentle, where one swipe of a ring, snags half of the fabric, it's really, to me, the fabrics unusable. Because again, like, if we're telling women, you can live in our pieces, you can travel in our pieces, you can wear them day into evening, there's very little room for something to become torn or snagged within one move or the wrong movement of your hands."

This again goes back to the designs being functional and the highest quality, which is achieved through intentional selection within every step, especially the material selection. The material selection process and respective testing methods used by MONO is another example of how MONO utilizes semiotics as a prospective process (anticipatory) that predicts the wearers' ability to "live in," "travel in," and "wear them day into evening" based on the material. This material must signify these qualities outlined above to then become encoded with the message, or meaning that these pieces are made to be lived in

**Intentional Color Selection**

Along with intentional material selection, quality, and production that align with the brands identity, color selection is also very intentional. Color selection is as intentional as their other processes and thoughtfully done to be cohesive with previous collections as well as harmonious with nature to achieve the functionality they strive for. As previously mentioned, they are not trend driven and this applies to color, too. CD explains that:

> We're probably the opposite spectrum of many sort of bright colored companies, we also don't do prints. We play a lot with texture. So, our colors, I have a tendency to call them moody, they have a **moody nature** to them, and I just think that that's kind of a

> **seriousness to the design**. But at the same time also, you know, I do think mixing colors that are maybe unexpected together but look fantastic, is something I love to play with, and that **unexpected nature of color** is what interests me versus just color for the sake of color.

Avoiding trendy, bright colors and patterns and instead utilizing interesting textures translates into easily worn, timeless pieces that are truly seasonless. The color selection process is carefully orchestrated to arrive at a color palette for each season that has a certain "neutrality" to the colors. This neutrality is where the color palette has a certain harmonious relationship with nature where the colors are organic and muted in nature. According to CD, MONO tends to base the collections in the "key neutrals: black, cream, navy and shades of gray." Beyond these key neutrals, the colors utilized in collections have a "neutrality" to them. Another semiotic as a prospective process (anticipatory) practice used at MONO, as CD explains that, when it comes to color "I really do love if a color can really encompass any woman. And that usually means that color has a neutral stance, and it can really play with any skin tone, any hair color."

Conceptually, this notion reflects the concept of semiotics as a "prospective and predictive science" as MONO pays attention to the consumer expectations and needs to provide a product that can potentially address the uncertainty of 'how will I look' from semiotics as uncertain process and be interpreted and accepted by "any woman" (Guedes and Buest, 2018). Physically, this notion of neutrality translates to the colors selected having more gray undertones versus red undertones. This means that they select colors that are more muted or neutral shades of color. These colors are more natural feeling, which means these are ultimately easier to wear with most color palettes and looks good on almost every skin tone or hair color due to their neutral stance. The practice of utilizing a set color palette of "key neutrals" for their designs

follows minimalist principles, and utilizing colors that have a more neutral stance and natural look closely follows eco-design characteristics – both helping to answer RQ 2. Color choices are critical to achieving a successful design that is true to the brand but also interesting to the client. Neutral colors can sometimes feel very dull; however MONO does have an interesting way of capturing the essence of nature each season with neutral toned, harmonic color palettes in new and interesting combinations.

**Intentional Construction for Functionality**

Intentional material and color selections are a key component to the level of quality that attributes to the physical timelessness, as well as the construction. The conscious and intentional construction is one of the most important production factors that promotes the longevity of the garment and at MONO, the standards held for construction quality is one of the top priorities. Intentional practices in production with attention to detail of the construction of each design is critical to creating the multifunctional, reversible pieces, as the inside is just as important and well thought out as the outside. These pieces require thorough planning and thoughtful construction choices to successfully achieve the beauty and functionality they aim to achieve. Apart from multifunctional pieces, each piece has the highest quality sewing standards as well as thorough quality checks to ensure each piece is perfect. In the interview with MONO's production manager, PM for anonymity, she stressed the importance intentionality within the construction for sewing standards and high-quality fabrics "we really **have a purpose** behind all of the factors that go into making the garment and all the factors that contribute to the price." PM explains the importance of high sewing standards they employ, as well as quality check processes, stating that:

> "They're just like very **wearable, endearing, holds up against a lot of wear**, but done and look in a very beautiful way. So that's a good quality of sewing, we are very intentional about that. And that's why, like for instance, like our QC process like takes forever because we're **intentional about going through literally every single piece**. And making sure that everything really did get **executed perfectly**."

PM also explained that the levels of production are critical to sustainability and to achieving the highest level of quality. The level of production is a crucial factor to achieve this level of quality and perform thorough quality checks on each individual garment. PM explains that at MONO, producing "**smaller volumes speaks to sustainability**" as well as the "endearing design and wear, all of our pieces are designed to last forever and we really do treat them that way." She explains that compared to mass production companies that use blends to cut costs, at MONO, since they have smaller volumes, they do not cut costs in terms of materials or finishings. PM explains that they "always use 100% silk and they're always the most luxurious. And all the seams' finishes are done with binding, which is another high-level couture finish for the seams. And also, French seams." These construction methods are more timely and costly for production but produce the highest quality outcome that is required for enduring, functional pieces, and especially those pieces which are multi-functional and reversible. The high-level couture finishes for each seam is key to the functionality they aim to achieve in their pieces. FAD explains that "In each collection we want to have pieces that have that like **convertibility** or like **reversibility** aspect, because that is the **key focus of the brand**." This convertibility that is a focus of the brand through and through is achieved by intentional design for functionality and carefully designed multi-functional components. These components are very intentional and well thought out as they serve to create a piece that is beautiful and enduring inside and out. FAD explains

that this practice does not come easy as it makes designing “a lot more challenging, because you don't just think about the outside, you think about the inside, literally **how every seam is finished**, because that seam will not only be on the inside, but it will be on the outside.” According to FAD, having a mindset rooted in functionality as design practice is critical because:

> “it does **bring more value to the clothing**. And I think it also going back to **intention**, you have to have a lot more intention when you design that way because you can't just narrow something because it's going to look like shit when you reverse that on the outside. So having a lot of intention with design, I feel like really was needed.”

This intention creates added value as FAD explains because it creates pieces that allows the wearer to have several ways to wear their piece to create different looks or levels of comfort. Attention to functionality creates an added value to the pieces as they become a way to express individuality and creates a stronger connection to the wearer as it becomes an easily worn piece for the client. Achieving functionality requires design and production to be done with intention all around. Intention in the design, to create something that is true to the brand and can be worn in many ways, with many different looks, and for the rest of time. Which goes back to the quality of the garment, as FAD explains that “I feel like by having that reversibility mindset and functionality mindset when designing, really helps you **focus on the quality** because again, things need to be **beautiful through and through**, they can't be beautiful only on the outside, they need to be equally as beautiful on the inside.” This statement is key to their design and production as they have this intentional process that is executed with a purpose to design and produce pieces with innovative materials and high-level construction pieces with careful attention to the quality of each piece.

**Intentional Production**

At MONO, to achieve this level of quality, care, and functionality, there is an emphasis on producing smaller volumes as well as emphasis on locally produced pieces. PM explains that they are intentional within the production process, beginning at the sample phase as:

> "Other companies will make a sample in every single color, and then continue to make samples with all the adjustments. We aim to not make more than **three samples**. And we don't just make a bunch of samples that aren't going to go in production, we tend to cut down before even getting into the sample making process."

This is a key practice that MONO does with their production process, as they reduce waste of materials and resources by cutting down styles prior to production, as well as creating less waste by perfecting patterns and cutters musts prior to sample making to lessen the number of samples necessary prior to production. This practice is possible also by producing the traditional two seasonal collections a year, a C2CAD practice outlined by Gam and colleagues (2009), as they have more time than other companies to perfect the designs, tech packs, and patterns prior to sample making and production.

In line with their core values to minimizing middlemen within the process, MONO produces everything in New York City's garment district where they have a relationship with each collaborator along the way. The garment district, according to PM, is set up for "quantities 100 to 200 pieces of anything." In an interview with the production assistant, PA for anonymity, she explains that at MONO, they produce "small batch" with "size runs with as little as 10 pieces." PA explains that in her experience in producing small batch "it tends to be like less wasteful" as they "often use up all of the fabric when we produce the style." PM explains how they only buy what they need and from there, they

> "We'll give them a little bit more than what they need to create the product, but for the most part, we truly just **give them [factory] what they need**. And then once they do what they need to do, **we collect waste**, or often a lot of our fabrics kind of go across style groups. And so, we'll take what they used, to the other factory to create another style, and they'll use that up. So, also trims can kind of be shared across groups with different factories. So, we kind of tried to divide things up in the best way. Which allows, the **collection to be more connected and cohesive**, and then it kind of allows us to expand those materials across multiple styles, and then we use up those materials more. Which is kind of **our 'as little waste as possible' mentality** is kind of reflected."

With this process to reduce waste by sharing previously utilized resources to create other pieces, they are reducing waste as well as being intentional about creating cohesive collections. They also take measures to reduce waste in grading, which PA explained that the graders determine "how to best place all of the pattern pieces on the fabric in order to utilize it to the fullest extent" which PM and PA explained that it results in an 80-90% fulfillment rate, with 10-20% waste to ensure "you're able to cut everything appropriately." Along with producing smaller volumes, MONO's production is traditional in terms of production seasons. Apart from the core collection, which is always available year-round, MONO produces two, limited produced, seasonal collections. Cycle 1, which is warm weather and cycle 2, which is cool weather. MONO utilizes traditional production seasons, producing two collections a year, which is a practice of eco-design, which also involves minimalist characteristics, as they have a smaller impact by producing traditional seasons of limited quantities. This practice also creates an added value to the client as there is a limited quantity, so the piece is unique and according to CD "it's a piece of clothing that they [clients] want to cherish."

Intentional production volumes are an important part MONO that makes them unique and sustainable. Smaller production volumes are achieved through another intentional practice of the company, as they base their production mainly off pre-orders from trunk-shows and private appointments. This goes for seasonal as well as the core collection, MONO practices on-demand production, a technique stressed by the C2CAD guidelines to reduce waste and overproduction. The results of trunk shows are a component of their process where sustainable production is the most notable. As the next seasons samples are on display, one large event is held to showcase the current season as well as the following season, then private appointments are held for clients to browse, try-on, and purchase pieces, including pre-ordering the next season. Many times, these clients leave with a few pieces or no pieces, as they have their pieces specially fitted by the creative director/designer herself to be altered, and many pieces on display are samples that will be produced after the order is placed. This pre-order, for both the current and following season allows for MONO to get an idea of how much of each piece they will produce for the following season. This creates a more intentional process, as they base their production off orders and preorders.

### Creating and Connecting a Community through Relationships

As previously mentioned, CD explains her purpose as a designer as: “I aim to conceive, design, develop, communicate, and sell our pieces to a community of women who will use each look as a point of communicative power.” This notion is reflected within the many relationships formed throughout her design, production, and retailing practices. These connections created between people and products, and products and value, are a direct reflection of the personal relationships built to produce lasting pieces and educate clients to connect their community.

According to the Merriam-Webster Dictionary, relationships is defined as the relation connecting or binding participants in a relationship (Merriam-Webster.com Dictionary, n.d.). This definition is integral to the core values and ultimately the purpose MONO serves as a company. Part of the core values of MONO, the second pillar, *architectural studio mentality*, serves to create an ongoing, deep level of dialogue and understanding with each client. This pillar, reflected in all their practices, is rooted in building relationships that allows MONO to understand clients' needs and create pieces that exude their values while meeting the needs of individual clients.

The third pillar, *slow fashion*, also emulates the importance of building relationships at MONO. As previously mentioned, slow fashion translates to the minimization of layers or middle people, while maximizing direct relationships with mills in Japan, tanneries in Europe, factories only in NYC's garment district, and direct client relationships. CD explains that this pillar is "where we really are directly connected to both the making, we know every single person along the way who's making the product, so there's less middlemen." This is an important part of their process, knowing everyone that is part of the creation of each piece cultivates a direct relationship which then translates into higher quality, thoughtful pieces. MONO ensures this as they have direct, personal relationships with each member of the process, so each person understands the goal and product fully, even after sales. Personal relationships with stylists, specialized retailers, and clients allow for more personalized designs and how MONO's practices that build relationships promote capsule wardrobe creation.

**Connection with the supply chain**

MONO chooses the "harder route", like FAD says, which is a very important notion to this theme of being "intentional" as these relationships are the product of attention directed to an object of knowledge (Merriam-Webster.com Dictionary, n.d.) as well as to the notion of

"design" which is implies a more carefully calculated plan (Merriam-Webster.com Dictionary, n.d.). As previously stated, their pieces are made locally in NYC's garment district, where MONO takes pride in fostering connections with each collaborator in the process of creating each piece. PA explains that by producing locally and having smaller volumes this "small batch, close knit New York manufacturing community, and all of those relationships that we value so highly with these artisans that we work with that are, you know, located just here in the city." She goes on to say that:

> "Our relationships with our fabric mills, our trim people, the people we buy silk from, grading, pattern makers. Maintaining these relationships and respect for these people that are truly masters of our craft. It all ties into the quality and the special element of the garment because so much care and dedication is put into making these garments the best quality, the most special, that they can be."

Building and fostering such relationships with those who are, as PA says, "masters of our craft," takes an intentional mindset to seek out these people to be collaborators that help create pieces of such high quality with "so much care and dedication." This is a strategy many companies choose to forego as this is a strategy that does not come at a cheap cost. It cost time and more money to work with people that are local experts that will spend proper time to ensure the best final product.

**Connection through Trunk Shows**

Trunk shows are one of the most notable practices at MONO that builds relationships with businesses and clients. Each season, the creative director/designer (CD) attends trunk shows around the United States, private trunk shows hosted by Stylists and public trunk shows hosted by small, specialty retailers that carry MONO. The stylists and specialty retailers' MONO works

with are intentionally selected to build business to business (B2B) relationships, that have grown and resulted in personal connections with clientele.

According to their seasonal newspaper for the F/W 2022 collection, an article that outlined an interview with CD, stated that CD participated in more than 50 events nationwide to meet shoppers and "build upon existing relationships." The seasonal newspaper interview article also details how MONO works with 12-14 different specialty stores, where MONO generates about 30% of their sales from wholesale with these specialty retailers, and the other 70% consists of "direct-to-client services such as in-studio sales and stylist collaborations." Stylist collaborations are the private trunk shows held with stylists nationwide, where clients come for private appointments with CD and the hosting stylist. The businesses and stylists align with the purpose of MONO and the styling of their pieces for capsule wardrobing. These specialty retailer and stylist B2B relationships are smaller and more intimate, allowing the stylists to understand their clients and the needs more fully, which allows them to promote MONO pieces to those they believe will appreciate and cherish them. MONO has formed many B2B relationships with small retailers throughout the United States for this purpose, so that they have a more personal connection with the stylists that creates a better pool of clientele with an understanding and appreciation for the pieces and MONO's values. For the private trunk shows, CD and the sales manager, and for public trunk shows CD and the wholesale manager, bring the samples from the upcoming collection to display for clients to place pre-orders. Usually, one large event is held during the trunk show to spend time with the clients in a more entertaining setting as well as to showcase the current season and the following season.

For the stylist collaborations, they hold private trunk shows where, after the showcasing event, the following days consist of private appointments for clients to browse, try-on, and

purchase pieces, including pre-ordering the next season. As mentioned before, much of the production is based off pre-orders from stylist collaborations, with private trunk-shows, and private appointments, and this also generates the majority of their sales. According to FAD, this practice is rare and that:

> "I think that the way that CD does things is incredibly special. And I think from like the trunk shows, that is really, it's really **unique**. Like, no one does that, because again, it is hard. And I think that's what makes a business so special is because **they choose the harder route in every way**."

MONO's decision to continuously take "the harder route" sets them apart from other luxury fashion companies, is the special business-to-consumer (B2C) relationship formed with clients, that allows for a continuous dialogue between MONO's staff, and most notably with the creative director/designer and the clients. CD explains that their goal within these close connections is to relay the message to the clients that "we are here for our clients, and we are always trying to sort of deliver this message we're here for you." This relationship with clients is formed through several intentional practices that create a close connection, such as: trunk shows, private studio appointments, try on boxes, virtual appointments, curated look books, personalized style guides, and piece alterations and repairs for life. This connection is a key component to the core values, intentional practices, and essentially the longevity of the garment. FAD explains, by choosing the "harder route" with CD going to these trunk-shows each season:

> "it delivers a **better product** and **more connection**. And I think, the **connection is there when she goes to the trunk shows** and meets the clients and has that **face-to-face interaction**, I think a that helps like sell the clothing more. But it also helps people

understand, like, most people that are not in design are not going to **understand the functionalities** of a garment, even if it's like obvious people are not going to get it."

Going to the trunk-shows, over 50 in the F/W 2022 season according to the seasonal newspaper, and providing the clients with this personal, one-on-one experience, and having this touchpoint with CD is how they educate their clients and gain their trust which cultivates a stronger connection to each other and to each piece.

**Connection through Education**

Educating the clients at the trunk shows about the materials and fabrications is key to helping clients better understand the proper care for the pieces that will ultimately prolong the life of the piece. CD explains that one of the important parts of building and maintaining these client relationships for the pieces is how:

> "We try to educate about garment care. So, garment care is extremely important, how you take care of your garment also will make a difference between that garment lasting a short amount of time versus long periods of time."

This connection that CD builds with clients to educate and personalize pieces is a special and unique component to their company as FAD says "I think it's also just like a lost thing" because a lot of designers don't make the time or care to do that because it's hard, but FAD says that's why she has loyal clients and that she "thinks people really respect her and her company for that." CD explains how she wants the pieces to be "with someone for their whole life, and then even passed on." So, she says it is important that the clients understand that this is their purpose and that:

> "If the garment you bought from us five years ago, a seam has opened or you ended up falling, and let's just say some part of the garment has ripped. We are here for you, to

> help and alter, adjust. So even if it's just like going up and down in weight, or something has changed in your life, and you want to make a long skirt into a shorter skirt, we're here and we provide that service forever, we will adjust and recreate and, you know, bring your garment back to life."

This personal relationship allows for this sort of education about garment care and services offered with the clients from the most reliable source, the creative director/designer herself. This adds value to the garments as each client knows that these pieces are made with care, and the company cares about a client's piece post-purchase and will take every measure to ensure the client is pleased with their pieces and the pieces functions and fit – and if not, they will help make changes until the client is pleased. MONO wants to have long lasting relationships with their clients which, in turn, creates longevity through clients' strong connections to the pieces.

Trunk-shows is one practice that MONO exudes the intentionality and connection they aim to achieve with the clients, and this interaction allows MONO to provide a "better product" but also a better understanding of the product which may foster a connection with the client to their pieces. The trunk shows are an opportunity for CD to fit each client to pieces and tailor them to fit them perfectly, FAD explains that:

> "Alterations is a big part of the brand, where if it doesn't fit your body right, we're going to make it fit, we're going to tailor it and **customize** it to you, so then it does, **fit you properly**. And then you feel **comfortable to wear this forever.** And we can also **continue to adjust it if your body changes** as well, so adjusting it to the body to make sure that each silhouette was beautiful on every person."

The personal relationships that build connection at trunk-shows allows the clients understand the functionalities and composition of the garments, the services MONO offers to make sure each

piece fits properly for life, and most importantly the services that prolong the life of the clients' pieces. FAD explains that at MONO, they offer repair services that:

> "if something also was like **damaged, we would also fix it for the clients** to make sure that they can **continue to have that peace for a long period of time**. So, we don't ever want someone to be like, 'Oh, my jacket ripped, she's going in the garbage', it's like, no we can fix it like, well, we want you to keep this jacket and have it for the rest of your life. So, we always found ways to do that too, to like **increase the longevity of the garments**, as well."

This creates a stronger connection between the client and the pieces as they will take proper measures to care for their pieces as well as hold onto their pieces. MONO promotes longevity through this connection with clients as they educate the clients on what services MONO offers to keep the pieces in good condition.

### Connecting a community within the Value System

Intention rooted in core values, or the four pillars of MONO, is reflected in all their practices seen in designing and producing well thought-out pieces, that reflect the brand's identity. This intention rooted within the values also is seen by building relationships with collaborators, such as the B2B relationships within the production community in the garment district, small, specialized retailers, and stylists, that understand the purpose and intention behind each garment as well as personal relationships with clients to understand and meet their needs. All this intention and purpose behind everything MONO does is to foster connection, which is the final theme revealed in the data. All these unique, intentional, sustainable traits have served to create a fashion ecosystem where the brand makes intentional decisions putting relationships

at the forefront. At MONO, FAD says they "always taking the harder route" which serves to create and maintain this sustainable fashion ecosystem. At MONO, it appears that connection is the ultimate end goal of everything they create.

**People and Products**

Designing collections with the clients in mind is key to staying true to the core values, particularly pillar two, architectural studio mentality, which cultivates creating a strong connection to the clients as CD explains:

> "We truly believe in connecting with the client and creating that atelier environment. We believe that when the client is invested, and really, like knows about the product that they're wearing, they can learn from us. That is the best way to purchase something, as it becomes thoughtful or meaningful versus just buying more stuff."

Beginning with the clearest display of the connection theme, the importance of building personal relationships, to connect people with products, and the value that holds at MONO. MONO provides a personalized experience for their clients through trunk shows, private studio appointments, try on boxes, virtual appointments, curated look books, personalized style guides, and piece alterations and repairs for life. The seasonal newspaper's interview article outlines that consumers and stylists' clients can receive the "try on packages" to get a closer look at any "potential purchases" as well as utilizing a virtual session with CD. According to the interview article, CD says that "consumers are not obligated to purchase their try on items before they are shipped, nor are they charged for the consultations, but there is a fee for alterations." This statement displays the importance that MONO places on making their services easy and accessible to allow for connections to the product. This practice reflects the connection MONO aims to achieve between people and products, as they believe in tailoring and personalizing items

to foster stronger connection between the clients and the product. Making their product accessible to clients to make a connection with, through one or many of these practices, displays how MONO implement every strategy foster a connection between their clients and their product, resulting from a reflection of their beliefs.

As previously stated, by CD attending trunk shows, this practice "delivers a better product" and creates "more connection" as FAD explains how "she meets the clients and has that face-to-face interaction." CD has fostered long term relationships with specialized retailers and stylists to make these connections with clients possible. The long-term B2B relationships formed here is imperative to fostering connection between the products and the existing clients as well as building relationships and connections with new clients. The connection made with stylists and specialized retailers allows for communication that cultivates a deeper understanding of the brand, the pieces, and the care and intention behind each piece for the stylists and specialized retailers, which allows them to introduce new clients that hold similar values to MONO. As CD says in the interview article previously mentioned:

> "I aim to conceive, design, develop, communicate, and sell our pieces to a community of women who will use each look as a point of communicative power. We design for "her," to help her reach her unique personal and professional objectives."

By fostering connection with clients through the stylists and specialized retailers, MONO can better understand the needs of each client that "allows her to use each look as a point of communicative power." Creating long-standing relationships with clients, old and new, allows MONO to fully reach their goals of creating pieces that are made for life, that foster a connection between people and product, that creates more value for the wearer, allowing them to reach those

"unique personal and professional objectives." This is possible because this connectedness is communicated and understood to the stylists, retailers, and most importantly the clients. The stylists and specialized retailers' MONO works with have been intentionally selected to build relationships with, reflecting their third pillar, slow fashion, which promotes direct, personal communication with each member of the process, so each person understands the goal and product fully which is that these pieces are made for longevity and a lifetime of use, made to become part of a clients capsule wardrobe, that they may wear time and time again without becoming "outdated" and without losing their value.

CD explains that the pieces are meant to be "with someone for their whole life, and then if passed on." To foster a strong connection between the wearer and their MONO piece, MONO has a dialect with clients to ensure pieces are meeting their needs and if not, they will take it and alter pieces for better fit and comfort or repair any damage. If a client is not satisfied with the fit, they offer one-on-one appointments for a fitting and alteration services to make it fit – for life. This practice shows how MONO aims to connect clients to their pieces, FAD explains that she wants people to feel connected to the product and put on a piece and think "that is me in a jacket, in a dress, or whatever it is, and having that reaction to something when they put it on, and they feel like great in that." They want clients to feel connected, comfortable, and confident in both the pieces they purchase and the company that will continue to be there with them to adjust their pieces as their body or lifestyle changes. FAD explains that the intention behind design, for her is that she wants people to feel "like a sense of like, connectivity or connecting to the garments." This is the purpose of fostering a connection to people and their product, to create a connection where clients see themselves in pieces that reflect who they are and make them feel great. This

connection between people and product is what serves to create a connection between product and value.

***Product and Value***

The connection between product and value is created in several ways with MONO's intentional practices and relationships that foster this connection. The practice of sending "try on packages" generates connection between people and product where "consumers are not obligated to purchase their try on items before they are shipped, nor are they charged for the consultations, but there is a fee for alterations" reflects the connection MONO cultivates between product and value. The practices that build relationships with their clients, outside of trunk shows private appointments, connects the product and value as they take every step to make the process easy and personalized for their clients, showing how much they value them as well as their connection to pieces, with no extra charge for their time. This practice reflects the connection MONO aims to achieve between product and value as they have created an archive full of the pieces from each season that have yet to sell, because they see value in these pieces that were intentionally developed and made with the utmost care. These pieces are continued to be utilized for the personalized services, such as the try on boxes, because they value them and believe in clients connecting with them. The archive shows how they connect product and value, as well as how they are utilized for a more personal experience. They have an archive full of items to create an experience tailored to a client with pieces that they believe will create a connection between the client and the product. This emulates how they believe in the value of their products and implement every strategy to portray the value to their customers in a way that is personal, resulting from a reflection of their beliefs.

The archive is a direct reflection of the connection between the people and the product that creates a connection between product and value, is seen behind many of the intentional design process, as MONO is not trend based, but rather, they are the opposite. As previously mentioned, when analyzing the intention behind the inspiration, MONO creates pieces that are intentional and thoughtfully crafted to be timeless to avoid becoming "outdated." They have a minimalist, functional, and most notably an intentional mindset behind each piece. This mindset allows MONO to "conceive, design, develop, communicate, and sell" these pieces that are "seasonless," which fosters a stronger connection for MONO and the clients to the pieces. When CD explained the importance as to why their pieces do not become sale items, she also explained this notion of being each collection being special and having its own story:

> "And just because that piece came to life two years ago, it doesn't mean it's outdated and not great. And also, like different collections stimulate different clients in different ways. So there could be a client that we've never met before, and they absolutely adore this particular idea that we did in a season that was years back. And that client doesn't necessarily think about seasons, to them, it's a piece of clothing that they want to cherish. And I think that's how pieces should be looked at."

This notion fosters a connection with the clients, as MONO has a connection to each season and values each piece, which is reflected in the way clients value and "cherish" their pieces. At MONO, because they do not over produce, they are able to store and sell previous collections that remain in the "archive" which is conveniently located in their office space. CD explains that:

> "We call our seasons that are not the ones that are right here with us as our archive. And, you know, we really are against sales and putting any of our pieces on sale. And so, our archive, you know, we cherish it, and we sell it as the great ideas and pieces that you know, we've had, and we continue to believe in."

CD explains that previous collections are those that are "not the ones that are right here with us," meaning the current collection, make up the "archive." Most companies cannot say the same, as most overproduce and have current collections stored in massive warehouses, and previous collections become marked down, go on sale, and eventually find their way to an off-price retailer. This practice fosters greater connection between the wearer and their pieces, as they are valued by MONO and kept after the "season" is over because the pieces are seasonless and timeless. The archive is comprised of pieces that are meant to become part of a client's capsule wardrobe, which may be worn year-round and styled in many ways with other pieces.

MONO also fosters a greater connection between the clients and their pieces that in turn promotes the longevity and the life of each piece by providing services such as repairs and alterations to ensure that a piece that a client cherishes and has a connection too is well taken care of and preserved. CD explains that this service also allows the clients to be fully connected to their pieces because they communicate that, at MONO:

> "we're here and we provide that service forever, that we will adjust and recreate and bring your garment back to life. And so, we've done everything from alterations to repressing and refreshing the garment for our clientele or I even helping them with their cleaning and specialized cleaning, for them to really have longevity with their garment."

At MONO, they are invested in each client and each piece in a way that is unique and not seen many other places. They want clients to feel connected, comfortable, and confident in both the

pieces they purchase and create a stronger connection between the product and value by assuring that the company will continue to be there with them to adjust their pieces as their body or lifestyle changes. They also want to ensure that these pieces become part of their clients lives forever through this practice, so that these cherished, high-quality pieces may become heirlooms and passed down, creating "multiple lives", passed for generations after the original client. FAD explains that "I think for us, what we like to think about is that there is no end in a way. That's kind of I guess the point of like luxury design and sustainable design, but also like minimalist design, it stands the test of time." This notion creates an even stronger connection between the product and value, as they want people to feel so connected to the product that has fostered such connection where the client feels a sense of identity in in the garment, that it becomes kept and valued and eventually passed down.

With such attention directed at creating life-long pieces, and even those that might have "multiple lives," MONO has a carefully calculated plan, from start to finish. Both the connections fostered by relationships with the collaborators and with the clients are a key part of the core values, the four pillars of MONO. This connectedness creates an entire ecosystem of people, those who understand the connections constructed between immaterial and materiality, the core values and the pieces, as well as the value of intentional, well-made, pieces, understood through semiotics on design. This practice results in constructing the ecosystem with those who understand and believe in the meaning of the brand, and this ecosystem MONO has built, containing those that strive to build relationships that foster connection through such an intentional process. By steering away from the current norms of the fashion industry, which has almost completely removed any personalization or connection through the combined growth from accelerating product drops, long lead times, and global supply chain issues resulting in

overproduction, MONO has created this unique ecosystem that minimizes processes, maximizes relationships which cultivates connection between people and product.

## Product Line Analysis

This study collected data from interviews as well as information on the core collection and the Fall/Winter 2022 Season product line from MONO's website, look book, and seasonal newspaper. The website provided material information for the seasonal collection in the fabric journal as well as detailed information on the page for each piece. The website also provided designers notes, functionality, and silhouette for a deeper understanding of the purpose each piece is meant to serve. This information was then combined with interview responses to further understand the detail and purpose behind each piece that captures the core values of MONO.

The product line analysis was performed based off the data collected from the participants during each interview. This data was analyzed to make connections and find patterns within each interview, which then was used to perform the product line analysis in combination with data collected from other sources. As previously mentioned, MONO produces their core collection year-round, as well as producing two seasonal collections a year. In this study, interview participants were asked "What three core pieces capture the companies' values to you?" This question was asked to gauge the responses of participants to find out what similarities there were within the perceived company values and the core pieces. Participants were then asked, "What three F/W 22 pieces capture the companies' values to you?" This question was used to further understand what qualities are perceived within pieces that emulate the core values, as the seasonal pieces tend to be more innovative and experimental as far as materials and construction.

## Product Line Analysis: Core Collection

The product line analysis for the core collection was performed utilizing the F/W 2022 seasonal look book, website, seasonal newspaper, and participant interview responses. These sources were utilized to gather information about the silhouettes, fabrications, colors, and functionality to then analyze in relation to eco-design and minimalism.

Colors seen within the core pieces align with the brand identity and values, containing the key neutrals and with several other neutral, or "moody" colorways. These colors emulate the values and align with the "neutrality" they aim to achieve at MONO, as the colorways contain the key neutrals, which according to CD are "black, cream, navy, and shades of grey" as well as jackets in natural shades of color, or colors with a "moody" nature (blonde, crimson, eucalyptus, maroon, and smoke blue). The color selection by MONO for core and seasonal collections aligns with minimalist characteristics outlined by the literature review, by utilizing neutral colors derived from nature (Eladwi and Kotb, 2015) and avoiding patterns, which according to the literature review, challenge minimal principles, creating distraction and unnecessary steps in the design and production process as well as features to the physical garment that may not ring true to minimalism as they take may away from what is the focus of the garment itself (Chim & Blebeab, 2013). When reviewing the look book and website, it was seen, in many looks, that MONO continuously pairs a black base outfit with the "key neutrals" as well as colors outside of the key neutrals, shown below in figure 4.1. This is likely due to black being the most utilized color in the core collection, with almost every piece available in the black colorway, and if it is a piece only available in one colorway, it is most likely black. Below shows how black is functional as a base look with almost any neutral colorway and allows the contrasting color piece to be emphasized and highlighted from the rest of the look.

**Figure 4.1**

*Core pieces shown styled with a black base look*

*Note*. Black base look with (from left to right) French grey reversible open leather jacket, beige leather blazer, reversible leather vest in beige and black, open leather jacket in maroon, and last a zip blazer in navy.

The look book features the looks in colorways that are frequently monochromatic, for a cohesive look, shown below in the top row of figure 4.2. Figure 4.2 shows the transformational habits from the F/W 2022 look book, with neutral monochromatic looks (top row, left to right) from off-white, greys, midnight, and black. It also shows the transformational habits with contrasted neutral looks (bottom row, left to right) ranging from pairings of steel grey and black, maroon and black, midnight and black, cool grey with off-white and haze blue, and lastly beige and black. This figure shows how the looks are styled to be cohesive with monochromatic colors

(top row) as well as how the transformational habits are styled with different neutral, contrasting colors, to show the functionality within the color of each piece (bottom row).

**Figure 4.2**

*Monochromatic and polychromatic neutral transformational looks*

*Note*. Transformational looks (top row) monochromatic, neutral, color looks and (bottom row) polychromatic, neutral, color looks, from the F/W 2022 season look book.

Each look aligns with minimalist monochromatic, neutral color values, but each piece is a color with a "neutral stance," that as CD mentioned, can be paired easily with any other looks, and "look good on every skin tone and hair color". The core pieces, apart from the transformational habits, come in a more diverse colorway, with pieces in neutral shades of greens, blues, and browns. Shown below in figure 4.3 are the images from the F/W 2022 look book with the core pieces styled in monochromatic looks (top row) and contrasting looks (bottom row) all within the neutral color palette that MONO has defined.

**Figure 4.3**

*Monochromatic and polychromatic neutral core looks*

*Note*. Core collection (top row) monochromatic, neutral, color looks and (bottom row) polychromatic, neutral, color looks, from the F/W 2022 season look book.

The core collection data shows that they are consistent as far as colorways, maintaining a cohesive, minimal color palette within their core collection, a reflection of minimalist characteristics. This data also reflects eco-design characteristics, as they utilize less colorways, no patterns, and produce a minimal number of pieces. Instead of utilizing patterns in their designs, CD explained that she prefers to experiment with interesting textures and unexpected color combinations. The most widely seen texture utilized within the pieces at MONO is leather. Within analyzing the core collection in the F/W 2022 look book, leather was seen mixed with a variety of materials. Below, figure 4.4, shows several leather pieces styled in combination with a variety of other fabrications. Starting from the left, figure 4.4 shows a “double face power knit,”

which is a neoprene adjacent fabric, reversible jacket styled with leather pants. Next, a “silk charmeuse” V-neck camisole styled with the washable leather open jacket. Then the tech jacket, which is comprised of both “tech organza” and “tech pique” styled closed and belted with the reversible leather belt, creating a beautiful layered visual effect with the tech organza and the glossy leather belt. Next, a “faille crepe satin” reversible top mixed with smooth leather plonge blazer. Last, the “Tencel tight rib knit” sheer top is paired with slim fit leather pants, both pieces combined create a look that fits close to the body, perfect for layering.

**Figure 4.4**

*Several variations of leather utilized within the core collection*

*Note*. Leather shown styled with other fabrications to create an interesting texture combination within the looks in the F/W 2022 look book.

The core pieces remain consistent, while making minor evolutions over time to the pieces, as the creative director/ designer, CD explains how they look at core pieces like product designers. At MONO they are striving to make “small innovations that really change the usage

and functionality for the end user to like the maximum." CD explains how the core pieces remain consistent and how currently, they are "working on the next evolution of them, like the next sort of 2.0 of a couple of them. So, the evolution is within the pieces versus changing out what four pieces it is." as each seasonal collection is produced, making MONO's core pieces the backbone of new designs for seasonal collections, as they integrate core pieces within the seasonal looks in the look book. Core pieces are a client's underpinnings, their staples, the pieces that they create the base of their outfit – core contains the "underpinnings and outerwear that pair with all cycles." According to the core valuables/convertible clothing section of their website, the core pieces are "made with a continuous fit, silhouette, and fabrics in neutral colors for continuous wear." Participant responses serve to further understand this statement.

Beginning with CD, she says that the three core pieces that capture the companies' values are what they call their "transformational habits." She explains that these pieces have a double entendre, transformational meaning that:

> "Each of the pieces is transformational in the way that can be worn, so they exemplify the multifunctionality that we stand for, and in our belief, they also transform your wardrobe. Meaning they're part of many, many looks and can really be integrated into different styling of each of those pieces into different looks, also, they can be worn really to any type of function. So, they have a wide variety of day to evening look-ability."

She then explains that the habit portion of this double entendre of transformational habit stems from a nun's habit, meaning the uniform that she would wear every day. She goes on to explain that "to us, we believe these jackets can be everyone's every woman's, or every person's uniform. So, it's a habit in your in your wardrobe." CD lists out the transformational habits (shown below in figure 4.5) that capture the values.

**Figure 4.5**

*The four "transformational habit" core pieces*

*Note*. Shown from left to right: convertible trench in midnight/black, washable leather zip jacket in smoke blue, tech jacket in black, and open washable leather jacket in smoke blue.

These pieces are all functional and have a layering ability as they are all made through a "minimal design" that allows for "sleek wear and endless pairing with any blouse or pant." The look book for the F/W 2022 season displays the transformational habits, and notes that:

> "In MONO Transformational Habits, we have taken the conceptual underpinning of our design origins – creating pieces that are multi-functional, versatile, reversible – all with technically advanced fabrics, such as washable stretch leathers – to develop a practical set of techniques and jacket typologies. The habits are our foundational outerwear pieces. The result: a design-minded aesthetic of minimalist utility, aimed at modern women who are both in motion, and in a constant state of creative productivity."

This explanation helps to better understand the concept of the transformational habit pieces as well as their mindset in relation to minimalism, functionality, and essentially their design origin.

Two of the four pieces are made entirely from washable leather, the zip jacket, and the open jacket (figure 4.6-7). MONO has a thorough, selective practice for the materials they use, and CD explains that “our leathers, and our shillings are all a byproduct of the food industry, and so they're part of the whole ecosystem.” These skins that are otherwise waste, then become part of MONO’s ecosystem that turns them into pieces that can be worn for life. These washable leather core jackets are available in black, beige, blonde, eucalyptus, maroon, off-white, steel grey, and smoke blue. functionality is achieved here through the material choice, as the washable leather “stretches and molds to the body with wear.”

The washable leather open jacket offers functionality within the “sleek silhouette through raw edge finished hems to streamline functionality and convertibility.” Through a minimal design consisting of a fitted back and sleeves to shape the silhouette, a fluid collar connecting to the center front and merging into the straight peplum, raw edge hem, allowing this jacket to be worn open or closed. Also following a minimal design that “ through the process of reductivism that strips the design object to its necessary elements,” this jacket is triml-ess, due to the simplistic design it will endure for many years without losing a button, breaking a zipper, or other malfunctions due to trims (Gubensek, 2017, para. 4). This jacket is having strong seams and zero trims allows it to be reversed, creating more functionality for the client. This convertibility is achieved through well thought-out, minimal design, displayed in figure 4.6, by allowing the wearer to style the jacket open, displaying the darker shade on the inside, or closed, creating a completely different, more modest look and a new shape that frames the body.

**Figure 4.6**

*The washable leather open jacket, shown in the off-white colorway*

*Note*. Jacket is reversible and may be worn in two variations, open and closed, displaying the color variation shown being open and the shape change shown being closed.

Then, the washable leather zip jacket, is a “moto inspired” leather jacket, with a slim fit through the body and arm and a slightly funneled sleeve at the wrist for optimal comfort and layering ability. MONO calls this jacket a “wardrobe essential” and part of the MONO “uniform” because it can be “layered and styled in countless ways.” With a neckline that is enhanced with two button snaps, a front two-way zipper, and side sleeve zipper for closure and an “urban silhouette, this jacket achieves convertibility, giving the wearer freedom to style the piece in several ways for comfort and different looks. Below, in figure 4.7, shows two of the several ways to wear the zip jacket, one open, with the side sleeve zipper unzipped for a larger funnel sleeve, The other shown is closed using the two snaps and zipper, while utilizing the two-way zipper to open the bottom, as well as closing the side sleeve zippers for a sleek, fitted look.

**Figure 4.7**

*The washable leather zip jacket, shown in the smoke blue colorway*

*Note*. Displaying style variations, open and closed, with closed displaying the two-way zipper function.

Made from washable leather and waterproof nylon, CD explains that this transformational habit core piece captures the values as it is a convertible "three-in-one trench," and this piece is available in midnight/black and crimson (figure 4.8-9). The "three-in-one" convertible trench is comprised of a reversible, removeable vest from washable leather to nylon, an undercoat in nylon, and a shawl collar that transforms into a hood. This convertible trench reflects the core values of MONO as each component can be worn together or removed and worn separate to create many looks. This trench reflects the functionality, convertibility, and innovation through each component as well as offering a more personal, adjusted fit with the removeable belt closure. The belt closure can be worn over the vest alone or over the vest and the trench, as shown in figure 4.9. The nylon utilized for this trench is a multifarious nylon, making it waterproof to reflect the transformational and adaptable values as well.

**Figure 4.8**

*One of the four "transformational habit" core pieces, a convertible trench*

*Note*. A three-in-one convertible trench. Shown are the individual components that may be worn separately and shown layering the three individual components, in the crimson colorway.

**Figure 4.9**

*Three-in-one convertible vest, in midnight/black colorway*

*Note*. Shown displaying the deconstruction of the vest with the belt closure being utilized in individual components.

The tech jacket is on of CD's favorite "travel pieces" because it is lightweight, comfortable, yet elevated. This jacket is constructed with a fitted body and sleeves made of a cotton knit, tech piqué fabric with a soft collar made of tech organza. This allows the jacket to be

easily buildable with a tailored jacket or blazer on top. Both the front and back body and sleeves are fitted, additionally the tech collar, which transforms into a straight peplum, drapes with ease – making this piece easily dressed up or down, used for layering, or worn as a "topper." With curved seaming to sculpt the silhouette, a collar that connects the center front to the straight peplum hem, this jacket achieves functionality, shown below in figure 4.10, as the structured tech collar may be worn flat to the shoulders, create volume by standing the collar up, and closed/belted for a more fitted look. This functionality and convertibility provide the wearer with the opportunity to achieve several looks and create different shapes to best accentuate individual bodies.

**Figure 4.10**

*Tech jacket shown in black colorway in three style variations*

**Connecting the Core Collection with Eco-Design and Minimalism**

Analyzing the look book and website reveled that MONO's core collection closely aligns with minimalist and eco-design characteristics in relation to the conceptual design choices,

sustainable materials and manufacturing, and minimal chemical processes and color choices. In total, MONO's core collection contains five transformational habit pieces (1 trench, 1 shawl, 3 jackets), eight core outerwear pieces (3 jackets, 3 blazers, 1 coat, 1 vest), nine tops (3 tanks, 2 long sleeve turtlenecks, 2 long sleeve V-necks, 1 bracelet sleeve cinch neck top, and 1 short sleeve top), ten pants (4 pencil/cigarette pants, 3 slim/skinny pants, 1 wide leg pant, 1 flow pant/skirt, and 1 legging), 1 reversible leather belt, and 1 swimsuit. In total, they produce 34 pieces in their core collection, including transformational habits pieces. This reflects eco-design characteristics in terms of the smaller production runs with minimal resources and raw materials wasted, as well as minimalism in terms of minimizing distraction to create a focused collection of timeless, quality, functional pieces.

The core pieces also reflect the functionality qualities of eco-design, with 1 fully reversible V-neck camisole, 1 reversible and convertible top, four fully reversible outerwear pieces, and five pants with bottom hem zippers for convertibility. All these pieces are designed to maximize functionality, though intentional construction elements, and minimal design choices, that create garments that are thoroughly thought out to maximize usage. The jackets, pants, and tops come in a variety of functional, reversible, or convertible silhouettes that allows each piece to be easily worn on any body type, another component of eco-design as this promotes versatility and ergonomic comfort. With thoughtfully made yet minimal design choices, many pieces are functional and provide the ergonomic comfort necessary for eco-design pieces, with zippers for changing the fit and silhouette, locking zippers for comfort, reversible materials for several versatile looks, and all made from the highest quality material for durability and easy wear. Of the 34 core pieces, ten of them are made in one colorway, nine black and one grey and seven pieces are made in two colorways, mostly black and white/off-white. The most

colorways produced in the core collection is seven, in a transformational core piece, the reversible, washable leather, open jacket. This minimal colorway and quantity of pieces in the core collection reflects minimalism in terms of only producing a set number of styles, which CD says that the transformational habits "have always been it." This also reflects eco-design by having a minimal, set number of neutral color choices for the core collection.

The balance of the core has had minimal style additions over the years, with occasional color variations, minimally producing core in neutral colors and consistent styles, reflecting both eco-design and minimalist values by remaining consistent yet innovative in the pieces so they remain focused, timeless, and functional. The core collection reflects eco-design in terms of minimal production runs, maintaining a minimal number of consistent and cohesive styles, and utilizing materials with less dyes and chemical processes which minimizes the steps to production and manufacturing, minimizing their environmental footprint. This reflects minimalism, staying consistent in minimal design details, that create functional, timeless, high-quality pieces, that through a minimal production process, were given the utmost attention and care to achieve this goal.

Below, tables 4.1 and 4.2 contain the ratings of each core collection item, identified by participants in interviews to be the pieces that capture the core values of MONO, rated according to their reflection of eco-design and minimalist characteristics. Further descriptions of each rating are below tables 4.1 and 4.2, in tables 4.1.1 and 4.2.1. These tables contain further descriptions of eco-design and minimalist qualities, those which are a direct reflection of the literature review outlining the characteristics and qualities of eco-design and minimalism, as well as further qualities discovered through the in-depth interviews and the product line analysis.

**Table 4.1**

*Rated eco-design characteristics of MONO's core collection.*

| Eco-Design Ratings: Core Collection | | | | |
|---|---|---|---|---|
| Item Piece | (a) Conceptual design | (b) Sustainable materials | (c) Color choices | Total |
| Leather open jacket | 4 | 4 | 4 | 12 |
| Leather zip jacket | 4 | 4 | 4 | 12 |
| Tech jacket | 3 | 3 | 4 | 10 |
| Convertible trench | 4 | 4 | 3 | 11 |
| Slim tech pant | 3 | 3 | 4 | 11 |
| V-neck camisole | 4 | 4 | 4 | 12 |

**Table 4.1.1**

*Descriptors of eco-design characteristics of MONO's core collection.*

| Conceptual design | Sustainable materials | Color choices |
|---|---|---|
| - Transitional<br>• Minimal design elements<br>• Layering capability | - Circular fibers<br>• Biological or technical cycle<br>• Recycled fibers<br>• Utilizing by-products | - Neutrality<br>• Achromatic color choices |
| - Functional<br>• Multi-functional forms<br>• Convertible<br>• Reversible | - Durable fibers<br>• Abrasion strength and resilience | - Natural colorways<br>• Natural color with minimal variation across styles |
| - Ergonomic comfort<br>• Fit and silhouette shape<br>• Curved lines<br>• Breathable properties<br>• Elements promoting freedom of movement | - Mono-material<br>• One main material used for a piece<br>• Utilizing one material across styles | - Versatility<br>• Colors may be worn in a variety of looks |

*Note.* Description of ratings (1-4) qualities for eco-design (a-c) of table 4.1.

**Table 4.2**

*Rated minimalist characteristics of core collection.*

| Minimalism Rating: Core Collection | | | | |
|---|---|---|---|---|
| Item Piece | (d) Conceptual design | (e) Sustainable materials | (f) Color choices | Total |
| Leather open jacket | 4 | 4 | 4 | 12 |
| Leather zip jacket | 4 | 4 | 4 | 12 |
| Tech jacket | 3 | 3 | 4 | 10 |
| Convertible trench | 4 | 4 | 4 | 12 |
| Slim tech pant | 3 | 4 | 4 | 11 |
| V-neck camisole | 4 | 4 | 4 | 12 |

**Table 4.2.1**

***Descriptors of minimalist characteristics of MONO's core collection.***

| Conceptual design | Sustainable materials | Color choices |
|---|---|---|
| - Silhouette<br>• Clean lines and harmonic shapes<br>• Minimal design elements<br>• Well-balanced proportions | - Mono-material<br>• One main material<br>• Double-faced fabrics for reversibility<br>• Utilizing one material across styles | - Neutrality<br>• Utilizing key neutrals<br>• Colors stemming from key neutrals<br>• Harmonious color choices |
| - Functional<br>• Multi-functional forms<br>• Convertible<br>• Reversible | - Modular design and proportions<br>• Utilizes 80/20 rule, Golden ratio, or Fibonacci series | - Minimal colorways<br>• Minimal color variation across styles<br>• Monochrome colorways across styles |
| - Ergonomic comfort<br>• Tailored fit created through pattern lines<br>• Movement created with clean lines and minimal design details | - Fabric manipulation and interesting details<br>• Paneling<br>• Geometric shapes<br>• Creating interest with texture | - Versatility<br>• Easily worn colors<br>• Seasonless color choices |

*Note.* Description of ratings (1-4) qualities for minimalism (d-f) of table 4.2.

**Product Line Analysis Interview Responses for Core Collection**

MONO's creative direction and head designer, CD, explained that the four transformational habit pieces captured the core values best, which was also reflected in participant responses. The washable leather open jacket was identified as a piece that captured the core values from each interview. Former assistant designer FAD stated that the washable leather open jacket is a piece that captures the core values because it is a "well designed leather

jacket that many women can wear and love." This was a pattern within each interview, as the washable leather open jacket was chosen by each participant, as the first piece named when asked the question. The Production Assistant, PA, stated that it captures the core values because it is made from washable leather and is "the highest quality leather you can find really, we source our leather from France." Production manager, PM, said that the washable leather open jacket is:

> "sourced with really strong seaming and it's reversible, so it has a bit of the multi-functionality. It's also trim-less, which makes it something that's going to hold up for a long time. And it's something that translates to like a lot of different body types and a lot of different people. So that for sure is like a stable of the brand."

The tech jacket was also identified twice, once by CD and by FAD. FAD goes on to explain that the tech jacket and the washable leather open jacket are two of the pieces that have existed for over ten years due to the "great quality, great fabrics, but they're also timeless, they're not trend driven." The other washable leather jacket, the zip jacket, was identified twice as capturing the core values, one by CD and the other by PA because it is "made with washable leather, very high-quality leather and it's a kind of a timeless silhouette." Then the convertible trench was identified twice, once by CD and again by FAD. FAD explains that the convertible trench is a piece that exemplifies the values of MONO as it is

> "for most people, it's an incredibly wearable to garment. It's very functional, but also, from a design perspective, well thought-out and it's reversible, worn in like four different ways which is a big part of that brand. And, it's made with really like great fabrics, it integrates washable leathers, that has a lot of great quality to it."

The only other core piece to be identified as one that captures the values of the company, as much as the "transformational habit" pieces, was the slim tech pant. The slim pant was identified by PA, she says it is a classic, cigarette pant that is

> "not trend driven piece. Made with really high-quality materials, sourced from Japan … And the zippers we use on this are sourced from Switzerland and they're the highest quality zipper you can find so, it's a really long-lasting staple pant."

Similarly, PM identifies the slim pant due to the innovation in recent years. PM says that now, the slim pant has a "locking head on the zipper" which is something that is not common other places. PM says that this captures a core value the company has because "if something is interesting, or innovative, or adding value to the functionality of the piece, we'll get it."
PM also identified their V-neck camisole to be one that captures the core values as it is functional due to its reversibility from the "shiny side and the mate side" as well as made from 100% silk, which she points out is:

> "something that we do not fake … a lot of people when they're doing that high of a volume on a piece, because it's one of our highest volume pieces, they'll do a silk blend or other things to kind of cut the cost of it. But we always do 100% silk and they're always like the most luxurious."

The V-neck camisole is seen paired with a variety of other pieces, as shown in figure ???, within the photos used for the website, look book, and seasonal newspaper. The camisole comes in black, midnight, off-white, haze, taupe grey, blonde, and beachwood. Therefore, it captures their entire color scheme consisting of neutrals and neutral shades of colors. Offered in a range

of colors, this camisole is one of their most popular pieces, as PM mentioned, as it is versatile and light, making it as MONO describes “a wardrobe and layering staple.” Below, figure 4.11, displays a few of the camisole’s colorways and how they can be styled with other core pieces, including the tech jacket and washable leather open jacket.

**Figure 4.11**

*V-neck camisole, made from 100% silk and fully reversible*

*Note*. Shown styled with other core pieces, including the washable leather open jacket (center-middle and right) and the tech jacket (center-bottom).

## Product Line Analysis: F/W 2022 Seasonal Collection

The product line analysis was conducted for the F/W 2022 seasonal collection utilizing the seasonal look book, website, seasonal newspaper, and participant interview responses. The collection being analyzed, F/W 2022, inspired by Charlotte Perriand, who was an influential product designer and environmentally conscious architect that aimed to create functional spaces. This collection is fundamentally rooted in MONO’s four pillars and beliefs and is reflected through the design and production process in MONO’s F/W 2022 collection through conscious

design decisions to make pieces functional yet beautiful, as well as harmonious with nature in form and construction. In analyzing the F/W 2022 seasons look book, it revealed that the collection is organized into four cohesive, concentrated, capsules. Foundationally rooted in semiotics, MONO comprehends and interprets explicit and implicit codes within their inspiration to reflect, alter, and create new codes utilizing the story telling approach as a stimulus seen in the seasonal look book and newspaper (Guedes and Buest, 2018). Each capsule contains unique pieces that reflect and build upon the inspiration with each capsule building upon each other, like the four pillars of MONO. Focusing on the theoretical premise that views semiotics as a "mechanism operating inside of design", rather than a "microscope to analyze the results" it can be seen how MONO utilizes semiotics as a reflective process (imaginative) to utilize technology such as mood boards in development to analyze and interpret the signs within the inspiration, those which inspire new ideas by reinterpreting the signs through design, and through storytelling and imagery as a stratagem to carefully relay the symbolism and meanings of the collection within the look book  Rooted in semiotic practice as an analytical tool, semiotics on design, to understanding the background of each capsule is essential to understanding the project methodology, semiotics for design, allowing readers to understand meaning and intention of the design of each piece as well as the core values reflected within each capsule, and thus exploiting the semiotic nature of design (Guedes and Buest, 2018).

According to the look book and seasonal newspapers description, the background of Capsule One, Sculptured Organicism, is described as:

> "Charlotte integrated natural materials and forms into her work, finding elemental shapes inspiring and spirit lifting. Utilizing "live edges" and other forms taken directly from the source, such as tree trunks, she crafted furnishing solutions. Her lifelong connection with

the vast, wondrous mountainous spaces of the alps guided her designs of structures that organically co-existed within their surroundings."

Below, figure 4.12 contains the four looks constructed by the design perspectives drawn from this background. The look book notes that from this background, the design perspectives for this capsule aimed to utilizes natural, linear elements as outlined in the background, to "mirror quality that may occur in nature." This is reflected in materials and construction techniques that create textures that mirror those occurring in nature. The design perspective also notes that this capsule will focus on "overall simplicity" within the pieces, with "minimal decorative details" and a "heavy focus on the foundational elements of the garments" with focus on multi-functionality. This reflects minimalist traits outlined in the literature review, as Eladwi and Kotb (2015) research outlines designing utilizing minimalist qualities, with focus placed on every element and detail to create cohesive pieces that serve multiple visual and functional purposes by utilizing natural textures, neutral colors, clean and fine finishes, This is reflected through the "craftsmanship" of each piece that is made to "bring the wearer closer to nature."

**Figure 4.12**

*Looks one through four, in order left to right, displaying the four looks created for Capsule One: Sculptured Organicism*

Each of the four looks in capsule one exemplifies the background, designed following the design perspectives from the background, creating pieces that are rooted in nature, with textures from nature such as the shearling coat as well as textures inspired (Eladwi and Kotb, 2015). Textures inspired by nature can be seen in the latex top in look one (figure 4.12), structed to hug the body, creating a stiff yet soft appearance, seen in many natural features. Another texture that displays a reflection of nature is seen in the top and skirt of look four (figure 4.12), with construction details in the top and skirt that create a linear, natural texture, that drapes naturally on the body.

According to the look book and seasonal newspapers description, the background of Capsule Two, Multifunctional Forms, is described as:

> "Perriand spent many formative years in Japan, where she met Yanagi Sōetsu, founder of the Mingei movement, rooted in the appreciation and use of craftsmen and potters who had the ideal of merging/integrating rural life elements into a modern/cosmopolitan sensibility. She worked with materials identified with Japanese culture, such as bamboo, woven wicker, lacquer and cherry wood: "infusing traditional techniques with self conscious sophistication." She developed a hybrid of the past and present, taking inspiration from traditional Japanese culture, while creating something innovative and modern."

The background behind capsule two closely aligns with MONO's core value of rearview innovation, that by not pretending to create radical newness, MONO looks back at to traditional designs for inspiration to create something innovative and modern. The designer perspective for this capsule notes, from the Perriand imagery, they were inspired by "the repetition of squares

and rectangles with the combination of organic shapes from nature" – a reflection of minimalist design practices of utilizing geometric shapes outlined in the literature review (Gubensek, 2017). This is reflected in the construction of the garments by "creating shapes within a garment, in seams, stitching, or combination of fabrics." The design perspective also notes that there is a focus on color and pops of color, as seen in Perriand's "Bibliotheque" with "separations of color." Last, there is a focus on curved silhouettes that "flatter the figure and create an interesting visual" to reflect Perriands "curvaceous" designs seen in bamboo chairs. Below, figure 4.13, displays looks five through eleven of capsule two.

**Figure 4.13**

*Looks five through eleven, in order left to right from top to bottom, the seven looks created for Capsule Two: Multifunctional Forms*

Each of the seven looks created for capsule two exemplifies the qualities and features derived from the background for this capsule. Each piece shown above reflects the "curved silhouettes" described in the designers notes. The first look, the sleeves of the jacket are constructed with a rounded shape that gives it a more curved look, the third look displays a curved silhouette created with a fitted skirt that also flatters the figure, the fourth also has leather detail over the top of the sleeves and shoulder, creating a curved visual. The designer notes for capsule two focused on creating squares and rectangles within the garments, which reflects the minimalist characteristics of minimalist design in relation to sustainable materials and manufacturing processes outlined in the literature review that outlines the use of geometric shapes, applied directly or as geometric figures in silhouettes (Gubensek, 2017). This also aligns with eco-design literature review data, as Na and colleagues (2011) explain that "First, the characteristics of multifunctional eco-friendly fashion design used squared silhouette, achromatic colors, plain patterns for pollution control" (Na et al., 2011, p. 119, para. 1). MONO utilizes this strategy, seen in several pieces from this season, which aligns with the literature review, allowing MONO to create "different types of seams in the bodice and sleeves; contours like necklines and armholes; 3D elements" (Kazlacheva, 2017, p. 2, para. 2). To create these square or rectangular shapes within the garments, in combination with the cured silhouettes, they utilized several strategies to achieve this look. Combined, these curved and structured shapes create pieces with an organic shape, seen above in look two, with an organically curved vest that is shaped with structured rectangles, in look four, this dress reflects the rectangle features in the body of the dress below the leather detail, and in look five and seven both with a square silhouette formed with rectangular shapes. Separations of color is reflected in look two and six,

both fully reversible to a side with a different texture (look two) or different color (look six) in figure 4.13.

According to the look book and seasonal newspapers description, the background of Capsule Three, Integrability for Alps Living, is described as:

> "Les Arcs Resort - a resort that was built with nature in mind, so that the structure would coexist with the terrain, while internally all of the spaces have innovative storage built-ins. The aim: to make efficient use of every square meter of space, via a fully integrated design approach. With a combination of built-in furniture, shelving, and kitchen units, each family unit is thought of as a whole, flowing from one area of the space to the next. Additionally, she fully integrated room dividers / bookcases: functioning with colored drawers and compartments, as used to divide a space, while being fully accessible from both sides. With variable built-in cabinetry solutions - she believed the consumer would have a flexible dialogue with the unit options, to personalize, and specialize the solutions to her own needs."

The background for capsule three also closely aligns with the core values of MONO. To "make efficient use of every square meter… via a fully integrated design approach" reflects the first pillar, design discipline, that emphasizes the integration of design and production operations to reach multi-form designs for multifunctionality, which reflects in thoughtfully designed pieces that maximize uses. This description also aligns with the second pillar, architecture studio mentality, as Perriand aimed for flexible dialogue between the user and unit operations to personalize and specialize solutions, MONO believe in the same approach. The second pillar take the same approach to design by creating an ongoing, deep level of dialogue and understanding with each client to understand and meet their needs. This description is reflected

in the pieces of the capsule, as described by the design perspective, with pieces that have layer-ability and "build-ability with several pieces working together," as well as pieces that are customizable and worn separately, making pieces that are "not required together for functionality." This is met also through the colors utilized that were derived from the "warm, rich tones in wood used at the Les Arcs Resort." The design perspective also notes that there is a focus on reversibility in this capsule to "allow the wearer to be able to fully utilize every piece of the garment on the face and reverse side." This promotes functionality as this allows pieces to be "fully functional and thought through at the level of each detail." Below, in figure 4.14, are looks twelve through sixteen created to reflect the values described for capsule three.

**Figure 4.14**

*Looks twelve through sixteen, in order left to right, the five looks created for Capsule Three: Multifunctional Forms. Integrability for Alps Living*

Each of the five looks created for capsule three exemplifies the qualities and features derived from the background for this capsule, with each look reflecting the "build-ability" created by each piece working together but also can be worn as separates and remain functional.

Although only one of the looks contains a reversible piece, look one with a reversible wool coat, the rest of the pieces align with the foundational notions of this capsule. Each piece is layer-able, function, versatile, and builds on each other to create a cohesive look that can be worn many ways. This is both achieved with details thought through at every level, including the colors that reflect the warm, rich colors in wood, as shown in the look book imagery of the Les Arcs Resort with deep blues, greens, and browns. This is reflected in the versatility and compatibility of the pieces due to their color stances, each cohesive and neutral. The vest in look four is compatible with both the puffer jacket in look six and the jacket in look three for a cohesive combination. The puffer in look six is also compatible with the base pant and top in look three. The base pant and top of look two is also compatible with the wool coat in look one. All these pieces are designed to be worn in a variety of ways, as mentioned in the design perspective, to promote functionality. Both the wool coat in look one and the puffer in look six align with the notion of allowing the "wearer to be able to fully utilize every piece of the garment" as the wool coat and puffer both have convertible components.

According to the look book and seasonal newspapers description, the background of Capsule Four, Le Bar Social Gear, is described as:

> "Perriand's Le Bar Sous le Toit was a tightly efficient, compact use of a tough geometric space to maximize a social and interactive experience, utilizing technologically advanced (at the time) tubular steel, which is at the same time both immensely strong, lightweight and visually captivating. The bar - designing an elemental table, to allow friends and acquaintances to become intimate and friendly, looking, laughing, loving directly at one another, over a glass (many glasses) of wine. That she only had the lowly quarters of a maid's roof loft (Sous le Toit, under the roof) to use and imagine this project, shows her

creative gimlet eye to take that which is historically known as low class, and working class, only to infuse it with the wonder and elegance of a modernist bar: where dreams are explicated."

Capsule Four did not have designer perspective following the description in the look book. However, the description provides rich details that can be assumed to be the notes used in creating this capsule with efficient, compact use of technology to maximize the user's experience. This vivid description also might imply that pieces, that might be "historically known as low class, and working class" pieces, such as work wear, will be reimagined, and elevated within this capsule, to infuse the previous designs with the elegance of modern design. Below, in figure 4.15, are final nine looks for F/W 2022, showing looks seventeen through twenty-five of capsule four.

**Figure 4.15**

*Looks seventeen through twenty-five, in order left to right from top to bottom, the nine looks created for Capsule Four: Le Bar Social Gear*

This capsule captures the working class look from the description and as stated above, they elevated the work looks within this capsule, to provide a more day to night look-ability within each piece. This capsule contains a very cohesive color throughout the looks, and styles that are buildable with other pieces within and outside of the capsule. This capsule really captures the essence of each capsule, reflecting the simplicity and "minimal decorative details" of capsule one all the looks, especially in one, five, six, eight, and nine that utilize ties and button details to give a more versatile and interesting look to the pieces (figure 4.15). This capsule also reflects the essence of capsule two, with the "curvaceous" silhouettes as well as the structured square and rectangle construction of tunics in looks one and seven and the dress of look four with square panels in a contrasting fabrication. This capsule reflects the essence of capsule three, as previously stated, within the looks that are buildable, as well as the looks that allow the user to personalize the pieces with tie and cinching trims, seen in look one, five, and six.

**Connecting F/W 2022 Seasonal Collection with Eco-Design and Minimalism**

There is a large relationship between the seasonal collection and eco-design within the transitional elements, as each piece is designed for layering capabilities, as stated by the design perspective for capsule three, stating the pieces are designed to have layer-ability and "buildability with several pieces working together." The pieces also are customizable, and elements may be deconstructed to be worn separately, making pieces "not required together for functionality." This notion is rooted in eco-design characteristics as outlined by the literature review, which promotes the pleasure of variety and versatility which are components of eco-design fashion design (Harper, 2017). Eco-design and minimalism emphasize the importance of multifunctionality which in turn relates to the durability of the design, allowing for easy repairs,

updates, to create a functional and flexible garment as outlined by Harper (2017). These pieces also represent eco-design in this way through their multifunctional, reversible forms, creating maximum functionality for the user. This practice aligns with eco-design as found in Na, Kim, and Lee, (2011) research, stating that "5 changeable types of multifunctional eco-friendly fashion design which were changes in changing forms, material changes, item changes, detail changes and complex changes" (Na et al., 2011, p. 119, para. 1). Their research goes on to explain that

> "Third, as the result of changeable types by method of expression, the changing forms were expressed by removable, material changes by reversible, detail changes by open and close and item changes by shifting. Forth, the formative properties of multifunctional eco-friendly fashion design had flexibility, multifunction, versatility and amusing" (Na et al., 2011, p. 119, para. 1).

As they outlined, eco-design fashion has flexibility, functionality, and versatility, all reflected in the designs created by MONO. Ergonomic comfort is also a key component of eco-design, which is reflected in this collection in a variety of ways (Cunha and Broega, 2009). Cunha and Broega's research explain that "Ergonomic comfort is related to the body movement comfort, the ability of a garment to allow freedom of movements, has to do with body shaping, clothing patterns making and sewing" (Cunha and Broega, 2009, p. 864, para. 1). This is critical to the eco-design practices that promote functionality, MONO utilizes construction elements to promote ergonomic comfort and functionality, such as slits in the side seams on the scaley leather vest or the detachable collar of the convertible wool coat to be a scarf (Cunha and Broega, 2009). Then material selections that reflect this are seen in every piece, utilizing compact, thin, sustainable down for the puffer, durable tech materials for other pieces, all intentionally selected to maximize functionality in the fabric's movement, shape retention, durability, and overall

aesthetic. This intention behind the materials is what allows these pieces to become the highest quality, timeless, versatile, and easily worn for any occasion for the rest of time.

The designer notes for capsule two focused on creating squares and rectangles within the garments, which reflects the minimalist characteristics of minimalist design in relation to sustainable materials and manufacturing processes outlined in the literature review that explains the designers use of "lines and geometric shapes in monochrome palette" (Gubensek, 2017, para. 4) that may be used in construction elements or applied directly as geometric figures (silhouettes). (Gubensek, 2017). Eladwi and Kotb (2015) research outlined the importance of minimalism within each element and detail to be cohesive and serve multiple visual and functional purposes by utilizing basic geometric shapes as outlines and using a single shape or a small number of similar shapes for components for design unity. MONO utilizes this strategy, seen in several pieces from this season, which aligns with minimalist strategies, allowing MONO to create "different types of seams in the bodice and sleeves; contours like necklines and armholes; 3D elements" (Kazlacheva, 2017, p. 2, para. 2).

Kazlacheva (2017) further explains how applying the Golden and Fibonacci proportions can be used in pattern making to create visually pleasing and functional shapes, when creating 3D elements. This practice was implemented, as outlined in the designers notes for capsule two, by "creating shapes within a garment, in seams, stitching, or combination of fabrics." The Fibonacci tiling can be seen most clearly in the construction and lines of the shearling vest in look two from capsule two (figure 4.13), the structured blouse in look three from capsule two (figure 4.13), the scaley leather vest in look four from capsule three (figure 4.14), the leather puffer seen in look five from capsule three (figure 4.14), the knit vest shown in look one of capsule four (figure 4.15), and the panel dress shown in look four of capsule four (figure 4.15).

These pieces all display this practice in the shapes created through seam lines and construction of the garment by dividing the garment proportions using the Golden ratio (Kazlacheva, 2017).

Colors seen within the F/W 2022 pieces align with the brand identity and values, containing the key neutrals (black, cream, navy, and shades of grey) and with several other neutral, or "moody" colorways (figure 4.16). The key neutrals seen in F/W 2022, with the most pieces available in the black colorway, are navy, charcoal, steel grey, stone, thunder,  These colors emulate the values and align with the "neutrality" they aim to achieve at MONO, as the colorways contain the key neutrals, as well as seasonal outerwear, knits, and other pieces that are more "statement" pieces to wear with other pieces of the season or core pieces. These pieces are in natural shades of color, or colors with a "moody" nature, that are drawn from the inspiration as well as fit the season. These colors are the shades of red (brick, burgundy, rust, deep red), green (white tea, sage, deep sage, hunter green, dark sage, hunter green), and blue (stone blue, slate blue, stone). Below, figure 4.16 shows the red, green, and blue colors seen in the collection, moving from light to dark for each color. Figure 4.16 displays the neutrality of these colors, with the neutral color each stem from shown below each group. The red is "deep red" that has a deep grey undertone, the green is "charcoal" that has a dark grey and brown undertone, and the blue is "mineral" that has distinct grey and black undertones but farther from navy to be more neutral.

**Figure 4.16**

*The three colorways utilized in F/W 2022 collection*


*Note*. Displays the three neutral colors, the shades of each color, shown stemming from key neutrals.

The color selection by MONO for core and seasonal collections aligns with minimalist characteristics outlined by the literature review, containing three colorways that contain variations of each color, in colors that stem from neutral colors (Gubensek, 2017). Monochrome color palettes, consisting of natural or earthy colors, are optimal for a minimalist design that provides a clear path during the design process when selecting fabrics and materials to create a cohesive collection (Gubensek, 2017). MONO is seen utilizing the described color pallete, consisting of natural or earthy colors, in both Core and F/W 2022 collections. Each color utilized in the F/W 2022 collection has a neutral stance that creates more functionality and versatility for the pieces. Shown below in figure 4.17 is the movement of colors across the F/W blue color theme, moving from shades of lighter blue (slate blue), into lighter grey shades of blue (stone blue), into darker grey shades (thunder and mineral), moving into darker shades of grey blue (stone), into shades of dark blue (navy), then moving to darker shades of grey navy (steel grey

navy), and then black. This is an example that shows how the colors have a neutral stance that utilizes colors that stem from the key neutrals, in figure 4.17, displaying how the blues utilized stem from shades of grey, moving from lighter shades into darker shades, eventually colliding with black.

**Figure 4.17**

*Shows the movement of colors across the F/W blue color theme*

*Note*. Moving from left to right: shades of lighter blue (slate blue), into lighter grey shades of blue (stone blue), into darker grey shades (thunder and mineral), moving into darker shades of grey blue (stone), into shades of dark blue (navy), then moving to darker shades of grey navy (steel grey navy), and then black.

The colors are utilized together in several pieces, the second look in figure 4.17 utilizes the stone blue (suede panel) within the slate blue (body) of the piece, creating an interesting visual textural movement using minimal design elements. This also is created by designing shapes within the garment, a detail of capsule two as well as linear seam lines which is a detail of capsule one to constructing an organic and natural shape.

Below, tables 4.3 and 4.4 contain the ratings of each F/W 2022 seasonal collection item, identified by participants in interviews to be the pieces that capture the core values of MONO, rated according to their reflection of eco-design and minimalist characteristics. Further

descriptions of each rating are below tables 4.3 and 4.4, in tables 4.3.1 and 4.4.1. These tables contain further descriptions of eco-design and minimalist qualities, those which are a direct reflection of the literature review outlining the characteristics and qualities of eco-design and minimalism, as well as further qualities discovered through the in-depth interviews and the product line analysis.

**Table 4.3**

*Rated eco-design characteristics of MONO's F/W 2022 collection.*

| Eco-Design Ratings: F/W 2022 Collection | | | | |
|---|---|---|---|---|
| Item Piece | (a) Conceptual design | (b) Sustainable materials | (c) Color choices | Total |
| Leather puffer jacket | 4 | 4 | 4 | 12 |
| Scaley leather vest | 3 | 4 | 4 | 11 |
| Convertible wool coat | 4 | 4 | 4 | 12 |
| Slim tech pant | 3 | 3 | 4 | 10 |
| Reversible shealing vest | 4 | 4 | 3 | 11 |
| Reversible wool coat | 4 | 3 | 4 | 11 |

**Table 4.3.1**

*Descriptors of eco-design characteristics of MONO's F/W 2022 collection*

| Conceptual design | Sustainable materials | Color choices |
|---|---|---|
| - Transitional<br>• Minimal design elements<br>• Reimagined, updated designs<br>• Layering capability | - Circular fibers<br>• Biological or technical cycle<br>• Recycled fibers<br>• Utilizing by-products | - Neutrality<br>• Achromatic color choices<br>• Color choices reflecting inspiration |
| - Functional<br>• Multi-functional forms<br>• Convertible<br>• Reversible | - Durable fibers<br>• Abrasion strength and resilience<br>• Seasonal material choices | - Natural colorways<br>• Natural color with minimal variation across styles<br>• Cohesive colorways with core |
| - Ergonomic comfort<br>• Fit and shape<br>• Curved lines<br>• Breathable properties<br>• Elements promoting freedom of movement | - Mono-material<br>• One main material used for a piece<br>• Utilizing one material across styles | - Versatility<br>• Colors may be worn in a variety of looks<br>• Seasonless color choices |

*Note*. Description of ratings (1-4) qualities for eco-design (a-c) of table 4.3.

**Table 4.4**

*Rated minimalist characteristics of F/W 2022 collection*

| Minimalism Rating: F/W 2022 Collection | | | | |
|---|---|---|---|---|
| Item Piece | (d) Conceptual design | (e) Sustainable materials | (f) Color choices | Total |
| Leather puffer jacket | 4 | 4 | 4 | 12 |
| Scaley leather vest | 4 | 4 | 4 | 12 |
| Convertible wool coat | 4 | 4 | 4 | 12 |
| Slim tech pant | 3 | 4 | 4 | 11 |
| Reversible shealing vest | 4 | 4 | 4 | 12 |
| Reversible wool coat | 4 | 4 | 4 | 12 |

**Table 4.4.1**

*Descriptors of minimalist characteristics of MONO's F/W 2022 collection*

| Conceptual design | Sustainable materials | Color choices |
|---|---|---|
| - Silhouette<br>• Clean lines and harmonic shapes<br>• Minimal design elements<br>• Well-balanced proportions | - Mono-material<br>• One main material<br>• Double-faced fabrics for reversibility<br>• Utilizing one material across styles | - Neutrality<br>• Utilizing key neutrals<br>• Colors stemming from key neutrals<br>• Harmonious color choices |
| - Functional<br>• Multi-functional forms<br>• Convertible<br>• Reversible<br>• Innovative designs derived from inspiration | - Modular design and proportions<br>• Utilizes 80/20 rule, Golden ratio, or Fibonacci series<br>• Shapes and lines reflecting inspiration | - Minimal colorways<br>• Minimal color variation across styles<br>• Cohesive colorways with core<br>• Monochrome looks across styles |
| - Ergonomic comfort<br>• Tailored fit created through pattern lines<br>• Movement created with clean lines and minimal design details<br>• Specialized materials and trims for comfort | - Fabric manipulation and interesting details<br>• Paneling<br>• Geometric shapes<br>• Creating interest with texture<br>• Innovations of past patterns | - Versatility<br>• Easily worn colors with core pieces<br>• Buildable<br>• Seasonless color choices |

*Note.* Description of ratings (1-4) qualities for eco-design (d-f) of table 4.4.

**Product Line Analysis Interview Responses for F/W 2022 Seasonal Collection**

In analyzing the participants' responses to, "What three F/W 22 pieces capture the companies' values to you?" This question was used to further understand what qualities are perceived within pieces that emulate the core values, as the seasonal collections are often more innovative and experimental as far as materials and construction. Where core pieces are viewed through the lens of a product designer, making minor adjustments and small innovations that

change the usage and functionality for the end user to the maximum, seasonal pieces are an opportunity for MONO to experiment with new, sustainable materials, natural dyes, and interesting trims. Core is meant to be consistent: consistently good, consistently timeless, consistently staples. Seasonal pieces are meant to also be consistent: consistently innovative, consistently fresh, consistently making a statement. The seasonal pieces are made to enhance the client's capsule wardrobe by incorporating more personality pieces that are seasonless, could be worn year-round, but also fabrications and colors that pertain to the respective season.

When asked which F/W 2022 pieces captured the core values of MONO, many answers were pieces that pertained to the multi-functionality values and rearview innovation that allows them to refresh previous designs – additionally several answers also pertained to pieces that utilized innovative, sustainable materials. Beginning with the most identified piece, three participants said the leather puffer jacket, from capsule three, was a F/W 22 piece that captured the companies' values, shown below in figure 4.18. FAD explains that this puffer was "a new thing for us… she [CD] had previously tried a puffer, a couple years prior, but it really didn't go anywhere." The previous puffer, developed in Japan, had pattern issues and FAD explains that they "wanted to revive that and make it significantly better. So, we made it out of leather, which was I think great choice." She explains that they also wanted to add more functional elements to the puffer, which they did with "the zip hood so then you can unzip it and then it kind of becomes like a cool collar." FAD further explains her reasoning for this piece being one that captures the values, stating that "the seam lines and that puffer were really great and I feel like it also just really looked like a MONO piece, but it was new."

PA also identified the leather puffer jacket to be a piece that captures the values, explaining a similar rational as FAD, that the piece is convertible with "a zipper down the center

of the hood, so you can wear it down over your shoulders, and then you can zip it up to wear it as a hood." This convertible hood is shown below in figure 4.18. FAD also explains that this piece used innovative, sustainable materials. She says that she met a person at a fabric show, and he was the first to create a "sustainable or like recycled down," which was called "thin down," that MONO utilized for the leather puffer. The "thin down" is made from "recycled pieces of like down that was used for other things," FAD says, so they take the down wastage and convert it into thin down sheets. FAD says these sheets are also more "functional for the human body" as they are lighter and more compact, so it still retains heat, compared to loose down, that easily overheats the body. FAD says that:

> "it's breathable, but it also will keep you warm when it's 10 degrees outside too. So, in that way, it was also functional. But also, we wanted to, use a more sustainable material as well."

PA identified this piece also because of its materials being "innovative and interesting." PA goes on to further explain that the recycled down filling used is "ultra-thin… so, it's a more compact, warm piece." FAD explains that this material was not only sustainable, but it was also easier to utilize in constructing the puffer as it is "made into sheets" and therefore, "easier to like, put into a garment," compared to using "loose down" that requires more specialized factories.

**Figure 4.18**

*The leather puffer jacket, in colorway steel grey/black*

*Note*. Displays the convertible hood (center-top, center-bottom, right), the seam lines (center-middle, right), and shown styled with another F/W 2022 piece, the scaley leather vest (left), as well as the tech pant, which is part of core and F/W 2022.

FAD also identified another piece from capsule three, the scaley leather vest, which is a piece at that exemplifies traits of capsule two, as it constructed with squares and rectangles within the vest, which is a note of capsule two of "creating shapes within a garment, in seams, stitching, or combination of fabrics." This is an example of how the capsules build upon each other, as the four pillars do, to create pieces that are cohesive and reflect similar qualities that in turn promotes functionality which maximizes the end uses. This vest captures the values of MONO as it is functional, versatile, and has buildability to maximize usage. FAD explains that the leather puffer "with the added like scaly leather vest underneath, also made for a really interesting look, but they also just seemed like layering ability and different functionality." The scaley leather vest is available in one colorway, black with grey, which aligns with minimalist

and eco-design values (figure 4.19). This vest is made of the highest quality of scaglia leather, sourced from Italy, that according to the fabric journal, “may contain natural variations that are not damageable, but rather integral to the character of each skin, and the result of a unique CD selection.” This piece is made to be a unique, buildable, durable piece that endures for the rest of time with the proper care. The fabric journal notes that this vest should only be dry cleaned with a leather specialist. The designer notes that this vest “supplies modern multifunctionality as a vest that can be layered. Evokes a geometric texture with the laser cut black leather with steel grey underlayer, outlined with steel grey leather paneling.” This vest provides functionality with the side slits for ease of movement, a metal front zipper, and straight fit that can be worn as outerwear or used for layering. Below, figure 4.19, shows the scaley leather vest from capsule three, displaying it styled as outerwear, the side slits for movement, and styled as a layer with the leather puffer.

**Figure 4.19**

*The scaley leather vest from capsule three*

*Note*. From left to right, shown being styled as outerwear, displays the side slits for ease of movement, and shown styled with the leather puffer jacket also from capsule three.

The second most identified piece, identified twice to be a piece that captured the companies' core values, was a convertible wool cloak, also from capsule three. According to the websites designer's notes, the convertible wool cloak is "cut with relaxed ease yet with sculptural structure, ideal for layering as a coat or cape." With kimono dolman sleeves, side snaps for convertibility along the full sleeves and side hem, and an optional belted waist, this cloak captures the values in several unique ways. The body is made from a chevron wool blend originating in Osaka, Japan, that according to the fabric journal, the wool is:

> "Made with super 100 wool, which is the number of times the worsted wool has been twisted. Worsteds undergo more spinning steps than woolens, which are typically used in knitted items such as sweaters, and the natural crimp of the wool fiber is removed in the process, resulting in a lighter, smoother yarn. This process ensures the fabric is light but has body."

This number, super 100 wool, indicates that this is a fine quality wool. At this level, the wool is more durable, less prone to wrinkling, and better suited for everyday wear (like a cloak) than a higher number like super 180, which is has a softer touch. This fabrication aligns with their values, as they aim to create quality pieces that can be "lived in". This cloak also has a coordinating belt for cinching the waist and convertible details made using lambskin leather (figure 4.20). Leather is utilized at the cuffs, center front, and hem outline, which not only adds a simple yet elevated design element, but also reinforces and protects the wool in the areas that are often stress points. Functionality is achieved through the cloak's convertibility, with snap closures for full sleeve and side seam opening, the removeable belt for a looser fit, and removeable collar attachment that converts to a scarf, shown below in figure 4.20. This added functionality is one that stems from a carefully, intentionally thought-out design that focuses on

maximizing uses for the client to make their pieces versatile, comfortable, and sleek. This piece was also identified by PA, who says:

> "it's reversible … it's just a really versatile piece … So, I'd say this kind of relates to one of the core values of the collection, we always have a couple pieces that are reversible or have a really innovative finish, whether it's like a scarf that can be attachable and detachable."

She notes that this piece is a strong one that captures the values as it is versatile, innovative, reversible; all important components of the core values at MONO that serve to create an added value within seasonal pieces. This piece is available in one colorway, charcoal, which is a neutral that is appropriate for the season that combines harmoniously with the other neutral colors utilized for F/W 2022 such as hunter green, shown below in the dress styled with the coat in figure 4.20.

**Figure 4.20**

*Convertible wool coat, in colorway charcoal with lambskin details*

*Note*. Lambskin details such as the removable/convertible collar, belt for cinching waist, and snaps to open or close side seams and sleeves for maximized functionality.

PM identified the slim tech pant as a piece that captured the vales, which is seen in capsules one and three as well as core. The tech pant is both a core and F/W 2022 piece, because of its popularity, its innovative “staying zipper on the waistline” and because the pant “was really flattering and fit a lot of customers well too.” Below in figure 4.21 is the tech pant, shown from left to right, in looks with the core collection, capsule one and capsule three of F/W 2022 collection.

**Figure 4.21**

*The tech pant*

*Note*. The Tech pant shown (from left to right) in the core collection, capsule one and three of F/W 2022 seasonal collection.

According to the seasonal look book and the website, the slim tach pant is only available in black colorway and is made of a viscose tech knit. This material gives the pant stretch and comfort while having the tailored shape of a pencil pant. It also features invisible zippers on the

bottom hem of the pant legs that allow for a more versatile shape, personalization, and allows for more versatile shoe options by expanding the zipper. With a locking side zipper and adjustable leg zipper, this characteristic aligns with the functionality design rooted in the core values that allows the wearer to fully utilize their piece, able to live, move, and style it with ease.

From capsule two, two pieces were identified by PA and PM to be pieces that capture the core values of MONO. PA stated that the reversible shearling vest in capsule two captured the vales because "We do a lot of leather and shearling pieces at MONO, and I do feel like those usually represent the core values the most because the materials are utilized to the fullest extent." She explains that the leathers they utilize at MONO capture the values in relation to utilizing materials to the fullest extent, which aligns with the slow fashion pillar, as well as this material represents the high-quality values that they hold to the highest standards. She also says that the vest is "stunning," with a two-sided zipper, the vest is reversible, allowing the wearer to wear it "on the shearling side and then the inner skin side and both sides are very beautiful." According to the look book and website, the vest made with lambskin shearling and is fully reversible "from silver tip shearling to nappa leather." The designer notes states that the vest "has an engineered diagonal zipper and cutouts at the side seam hems lineating an artful form." Designer notes goes on to explain that this vest "can be paired with a dressed look or layered elevate a lounge set for daily wear" which is seen in the look book imagery, showing the vest worn to elevate what could be viewed as an elevated lounge knit set, look one in figure 4.22.

PM identified the wool seamed coat as a piece of the collection, from capsule two, that captured the companies' core values, look two in figure 4.22This wool seamed coat is made from a double face wool blend originating in Osaka, Japan, giving the coat complete reversibility to two distinct color sides shown in figure 4.22. Its origin also reflects capsule two's description, as

Perriand found “inspiration from traditional Japanese culture” and the material sourced for the coat, and many of their pieces, originates in Japan. The coat has “a sculpted silhouette and kimono dolman sleeves shaped to evoke the curved lines of the coat” according to the designer notes. This silhouette is achieved through a minimal “understated” design approach that allows the coat to be fully reversible and functional “to finish off any look from casual to evening” also explained in the designers notes. PM says that the wool seamed coat is “really cool, because that was used with a naturally dyed plant button, a corozo button. And it is reversible from the front to the back.” This coat aligns with eco-design characteristics by utilizing a naturally dyed button, as well as minimalist characteristics with an understated design that allows for maximal functionality through reversibility.

**Figure 4.22**

*Two reversible pieces that capture the values of MONO*

*Note*. Two pieces from capsule two: multifunctional forms. From left to right: look one, reversible shearling vest; look two, reversible wool coat.

Both the vest and the coat are available in one colorway, which aligns with the eco-design and minimalist qualities being explored in this analysis. Both pieces identified by PA and PM aligns with the description of capsule two descriptions, creating a vest that is innovative and modern, as well as their first pillar, design discipline, as it is functional and can be worn in multiple forms.

The last F/W 2022 seasons collection item to be identified was by FAD and it was a piece from capsule four: Le Bar Social Gear. FAD identified the fitted jacket as a piece that captured the core values of MONO. She said that this fitted jacket was a reimagined piece based off one of the popular core blazers, both shown below in figure 4.23. FAD explains that this blazer was intentionally tweaked and updated with "these really cool buttons that I sourced in Midtown, so the top button was an organically shaped metal button and then the bottom two are these matte metal concave buttons." She explains how and why this piece was designed, stating "we just tweaked a core jacket, which was already a great piece for us. But we redesigned it made it fresh again. And then also add this like artistic element with the button details too." The fitted jacket is available in one colorway, charcoal, and the designer notes highlight the silhouette features stating that the "deep v-neckline that lengthens the silhouette and highlights any underlayer." The designer notes also highlight the silhouettes "accented shoulder with two piece sleeve cap and a light shoulder pad accentuates the shoulders and visually tapers the waist." This seasonal jacket was a re-design that added artistic elements within the button details to reinvent a successful core piece in a fresh, innovative way. This aligns with the fourth pillar, rearview innovation, that focuses on reinventing previous pieces in modern, functional ways. Below, figure 4.23 displays the fitted jacket (left) and the core blazer that was used to create the fitted jacket (right).

**Figure 4.23**

*F/W 2022 Fitted jacket (left) reinvented based on core blazer (right) for capsule four: Le Bar Social Gear*

Each piece highlighted by participants was a piece from each capsule of the F/W 2022 collection. several pieces identified were chosen for their functional, reversible, or convertible qualities, as well as pieces for their good fit, high-quality, and for being pieces that were reinvented. Many pieces identified contain multiple of these qualities. This reflects how collection is fundamentally rooted in MONO's four pillars and beliefs and is reflected through the design and production process in MONO's F/W 2022 collection through conscious design decisions to make pieces functional yet beautiful, as well as harmonious with nature in form and construction. In analyzing the seasons look book, it revealed that the collection is organized into four cohesive, concentrated, capsules. Each capsule contains unique pieces that each build upon each other, like the four pillars of MONO.

# CHAPTER 5

# CONCLUSION

Chapter 5 contains the following sections: (a) summary of findings, (b) implications and contributions, and (c) limitations and future research.

## Summary of Findings

Though sustainable design has been discussed in both industry and academia, limited scholarly research linking Cradle-to-Cradle apparel design and practice in the fashion sector exists, and this thesis serves to address this gap. Interviews with the creative director, as well as, the design and production teams of a New York City based luxury apparel company provided context to what sustainability looks like for their design and production process. This research aims to identify strategies in sustainable apparel design currently utilized in the fashion sector through a case study analysis of a New York based fashion luxury fashion company. The study's findings contribute to the discussion on new and developing sustainable pathways for changing the fashion design and production sector. The aim of this study was to explore the transferable sustainable apparel design practices within the fashion industry through the lens of a selected case study, that has refined, restructured, and reimagined their practices to overcome fast fashion barriers and run a business centered around their four pillars, or core values: design discipline, architectural studio mentality, slow fashion, and rearview innovation. Through this case study, it can be determined that MONO does follow the steps to C2CAD utilizing eco-design and minimalist strategies.

Beginning with step one of C2CAD, idea generation, MONO selects inspiration in an art or architecture movement that aligns with their values, seen in F/W 2022 inspiration of Charlotte Perriand. Through a thorough research of the inspiration, MONO develops four overarching themes, which translates into capsules, for the collection. Each capsule contains pieces that have meaning and serves a functional purpose that reflect MONO's values as well as the elements derived from the inspiration. This practice closely aligns with problem definition of step one, idea generation. Here they look at the inspiration and identify areas that they wish to design solutions for within each capsule.

For F/W 2022, the capsules consisted of capsule one, Sculptured Organicism, which reflected natural, linear elements as outlined in the background, to "mirror quality that may occur in nature" which directly aligns with eco-design characteristics to make apparel that is intentionally designed with the "functionality of the product throughout the life cycle (effecting the environment in terms of water and energy consumption)" in mind during beginning phases (Pal, 2017). Capsule one also focused on the "overall simplicity" within the pieces, with "minimal decorative details" and a "heavy focus on the foundational elements of the garments" with focus on multi-functionality, which directly aligns with minimalist characteristics (Eladwi and Kotb, 2015; VanEenoo, 2011; Park and Yim, 2013). Capsule two, Multifunctional Forms, focused on the "repetition of squares and rectangles with the combination of organic shapes from nature," aligning with both eco-design and minimalist characteristics (Gam et al., 2009; Kazlacheva, 2017). As well as curved silhouettes that "flatter the figure and create an interesting visual," which aligns with minimalist characteristics, utilizing clean lines and harmonious shapes to optimize fit and comfort, which can be accomplished using the Fibonacci series, golden triangle, or golden rectangle as a frame for the design or directly for pieces or elements of the

garment (Kazlacheva, 2017). Capsule three, Integrability for Alps Living, focused on the functionality in terms of the layering and buildability of each piece working together, which closely aligns with eco-design and minimalist characteristics. This capsule also focused on creating customizable, convertible pieces that may be worn separately and are not required together for functionality. This notion closely aligns with the functionality characteristics of eco-design (Cunha and Broega, 2009). Lastly, there was a heavy focus on reversibility that allows the wearer to utilize every piece of the garment, another key focus of eco-design and minimalism as this is achieved through minimal designs to maximize end use. Capsule four, Le Bar Social Gear, displayed a heavy focus the "compact use of tough geometric space to maximize a social and interactive experience." This was reflected in a capsule of pieces that have day to evening looks, containing elevated work wear that is mixed with the elegance of a modernist look. This is a key characteristic to both eco-design and minimalism, by making pieces that serve multiple purposes, which allows for easily transitional looks that maximize a social and interactive experience (Cunha and Broega, 2009; Na et al., 2011).

By identifying themes within each capsule that conceive design elements to focus on, MONO is practicing research of user needs in step one of idea generation. This practice reflects research user needs, as MONO utilizes the FEA model, that by having an architectural studio mentality, they have ongoing communication and close relationships to learn from their clients (Lamb and Kallal, 1992). This practice allows MONO to meet their clients' needs and craft personalized solutions tailored to individual needs – a direct reflection of the third tenant of cradle-to-cradle design, celebrate diversity (McDonough et al., 2003, p. 436).Through this separation of pieces into capsules, they can focus on key elements they wish to create for the capsules that meet user needs regarding the FEA model (Lamb and Kallal, 1992). They also

practice this through their personal relationships with clients that allows them to fully understand and create designs that meet these needs.

Step two of C2CAD, sample making is one of the most notable sustainable practices at MONO compared to other fashion companies. As discussed in the interview analysis, they are intentional with their materials selection and testing processes, one part of step two of C2CAD, as CD explained that "with every collection, we're researching and studying more about, like, really, truly working on selecting fabrics that are either sustainable, or are or are recycled." She also notes that during material selection and testing she has her own set of unique tests to evaluate the materials in terms of movement, comfort, shape retention, and durability. These tests are able to ensure they select only the materials that align with their core values and purpose to create pieces that are built to sustain and endure for a lifetime of use.

MONO also practices the C2CAD step of cost and design evaluation, during the production phase of developing the collection. Here is where MONO also shows sustainable characteristics, as they evaluate designs by fitting samples (with CD as the fit model) and adjusting and changes to the sample for optimal quality of production, and PM explains that at MONO they "aim to not make more than three samples." She also explains that "we don't just make a bunch of samples that aren't going to go in production, we tend to cut down before even getting into the sample making process." This sustainable practice reflects eco-design and minimalist characteristics in their approach to production in step two of C2CAD as they minimize their designs to create a more focused production, that reflects in the high quality, cohesive collections. This practice minimizes waste in both materials and resources used, a critical component of implementing C2CAD.

After materials selection and testing, cost, and design evaluation through the production of samples, the final quality evaluation of samples according to function and performance is conducted. If they do not meet their standards, this is where step three of C2CAD is performed by MONO. Step three is where MONO utilizes "intelligent materials pooling" a key component to cradle-to-cradle design that emphasizes collaborative approaches, such as sharing knowledge and resources to promote sustainable development (McDonough and Braungart, 2003). The sub-theme "connection with the supply chain," is reflected in every interview as each participant stressed the importance of the relationships with their collaborators within the garment district. PA explains that maintaining these relationships with their garment district collaborators that are "truly masters of our craft" ties into the "quality and the special element of the garment because so much care and dedication is put into making these garments the best quality, the most special, that they can be." When step two is rejected and they turn to intelligent materials pooling with their local collaborators, MONO can develop solutions by working with experts that they formed long-standing, close relationships with that equally care about the purpose of the pieces.

Finally, when designs are accepted after step three, MONO moves into step four of C2CAD, sustainable production. Here is the most notable sustainable element of their process, by narrowing down designs through their intentional process in step two, they minimize the number of styles going into production. They also minimize the amount of waste in sample making. MONO's production is traditional in terms of production seasons. Apart from the core collection, which is always produced on-demand year-round, MONO produces two, limited produced, seasonal collections, which is a practice of eco-design, which also involves minimalist characteristics, as they have a smaller impact by producing traditional seasons of limited quantities. Then, in production, they produce very intentional production runs, with lower

volumes that are “small batch,” as the garment district, according to PM, is set up for “quantities 100 to 200 pieces of anything.” PA also explains that in her experience, small batch production “tends to be like less wasteful” as they “often use up all of the fabric when we produce the style.” She also explains that often they produce size runs “with as little as 10 pieces.” Smaller production volumes are achieved through another intentional practice of the company, as they base their production mainly off pre-orders from trunk-shows and private appointments. This intentional practice to build relationships that foster connection between people, product, and value is one of the key contributors to how they implement C2CAD. Through this connectedness, MONO can have personal, direct relationships with clients to understand their needs, educate on garment care, and to provide services such as alterations and repairs that prolong the life of their pieces and make them last a lifetime. Interview data revealed that they design for pieces to be able to have “multiple lives” and in a way “no end” because their goal is for a piece to become so connected with the wearer that they keep it and pass it down to their daughters. This is their purpose, which they achieve through intentional design, production, education, and services that promote longevity.

MONO’s founder, creative director, and head designer explains that they discuss and implement sustainable practices through” thoughtful, meaningful design and execution.” This statement reflects the themes that were revealed throughout this research, of intentional design and production practices, that ultimately result in sustainable, circular practices that MONO achieves. Analyzing this research through the lens of semiotics, reveals their message, how it is communicated, as CD states in the interview analysis section,

> “I aim to conceive, design, develop, communicate, and sell our pieces to a community of women who will use each look as a point of communicative power. We design for “her,”

> to help her reach her unique personal and professional objectives. I am in this world in the service of and development of productive aesthetics, each piece to be used meaningfully and joyfully."

This reflects the theme categories that arose in the interview analysis. This message, that she aims to create pieces, for a community of women, to utilize as a point of communication, is quintessential to the C2CAD model outlined by Gam and colleagues (2009) that emphasizes sustainability as well as functional, expressive, and aesthetic characteristics (FEA model). The core values of MONO that are behind her statement "to conceive, design, develop" are those that fully align with C2CAD values, as well as the FEA model, to create functional pieces in term of utility, durability, reversibility, multi-functionality, and multiple end uses, eco-design in terms of materials, longevity, and functionality, and minimalism in terms of design, production, construction, and form. She goes on to say "communicate, and sell our pieces to a community of women" which again aligns with their architecture studio mentality as well as the C2CAD model. As MONO intentionally develops close connections and relationships, further outlined below, this allows them to define problems, analyze their market, identify, and research user needs based on the FEA model (Lamb and Kallal, 1992), and develop solutions – all parts of step one of C2CAD model outlined by Gam and colleagues (2009). Following the community of women that she says she designs for, she says they "will use each look as a point of communicative power." This statement packs in many meanings, which through the lens of semiotics, following a thorough interview analysis, this research understands it to reflect "her," a "point of communicative power" of her values, beliefs, and identity. MONO strives for clients to feel a connection with their pieces, they want clients to feel connected, comfortable, and confident in both the pieces they purchase and the company that will continue to be there with

them to adjust their pieces as their body or lifestyle changes. They ensure that they provide every service to further clients' connection with the product, ensuring the fit of the garment is tailored to their needs, if it does not fit perfectly off the rack, MONO will make adjustments and customize it to fit perfectly. This is a practice that aligns with the third tenant of cradle-to-cradle design, outlined by McDonough and Braungart (2003), to celebrate diversity, because MONO does not believe in a one-size-fits-all, inclusive design. rather, they acknowledge the differences and diversity within bodies to create more effective, engaging, wearable, and comfortable designs.

Theme categories revealed through the in-depth interviews consisted of theme category #1 reveals the answer through "Intention and Purpose as a Value System" with the theme Intentional practices as core values and sub-themes core values (a) design discipline, (b) architectural studio mentality, (c) slow fashion, and (d) rearview innovation. Theme category #2 "Intentional Design and Production" along with the sub-themes (a) intentional inspiration, (b) intentional material selection, (c) intentional color selection, (d) intentional construction for functionality and (e) intentional production. Theme category #3 "Creating and Connecting a Community through Relationships" and the sub-themes (a) creating connections within production B2B relationships (b) creating connections through trunk show relationships and (c) connection through education. From theme category #3, theme category #4 arose, "Connecting a Community within the Value System" and the sub-theme (a) people and product and (b) product and value.

Their message is revealed through semiotics by the creation of collections, by following their four pillars in theme category #1, and through their intentional designs and production practices in theme category #2. MONO's message is that there is care, integrity, intention, and

love behind each piece that is made for a lifetime of use and MONO builds and maintains trust with their clients. This message is then communicated, in theme category #3, by creating and educating a community of people, building relationships that foster connections. This community and these connections create and allow a constant dialect between B2B and B2C relationships, where MONO can communicate their message that these designs are pieces that are built with intention to be beautiful, quality, timeless pieces. This dialect also serves to communicate that MONO is there for their clients, which in turn communicates that these pieces are meant to be cherished, kept, serve multiple functions, and have several lives. This message, which is conceived by theme category #1, created from theme category #2, and relayed by theme category #3, then becomes attached to apparel, answering research question #4, through theme category #4, by connecting a community within the value system that connects people to product and product to value.

By conceiving, creating, and relay this message, MONO's purpose is revealed to be fostering connections, connections to people, connections to their product, and connections to value. This connection to value, in turn creates a long, sustaining life for their garments. With intentional practices, timeless, minimal designs, sustainable production, tailored and personalized product, made from quality, often sustainable materials, their product is made to endure forever. They create a connection to product through their design and production process, a connection to their product for clients through personal, close relationships that allow customization through communication, and this creates a value that fosters connection to these pieces. By being as connected to their product, storing it in the MONO archive, they show that they value these pieces, each special and made with care, and this translates to a connection to value for the clients, as clients understand the meaning and value created by these pieces. This connection to

value is what creates pieces that are kept and become part of a person's identity, a true reflection of their beliefs and values. This strong connection allows one to see this value, keep their MONO pieces, have them repaired and altered when needed, pass them on to their daughters, and create an heirloom.

## Implications and Contributions

This study has implications for the case study, MONO, the fashion industry, academia, and government policy makers. First, this research allowed participants in this study to open up and reflected on their day-to-day practices. Throughout the interviews, several participants expressed that they wanted to explore sustainable practices further moving forward and how there was room for improvement regarding circularity at MONO. This study's findings show that they are in fact taking almost every sustainable step to achieving C2CAD, however there is room for improvement. Reflecting on the interview responses and findings, how MONO practices sustainable design and production is unique. However, with such close relationships with clients and supply chain members, MONO could further improve their circular practices, by utilizing redesign for archive pieces or designing for deconstruction for ease of repairs in future collections.

Secondly, other small fashion companies that want to incorporate sustainable practices may benefit from this study's findings. Fashion businesses may want to consider the value of intentional business practices, through relationship building across the supply chain as these practices may promote a stronger connection with the brand. Providing a personalized approach to running small business may further client involvement in the product and result in creating a better product for all around sustainability in terms of environmental, economic, and social well-being. Removing MONO from the equation, as they are a luxury price point, this research shows

how companies can incorporate intentional practices that build personal relationships and connections with their market and supply chain to achieve circularity.

Third, the apparel industry may discover the findings in this study to be incredibly valuable and find it useful to start implementing C2CAD using eco-design and minimalist principles, or a variation of these in their own way to achieve C2CAD. Most importantly, the apparel industry needs to become more intentional with design and production practices, by switching to traditional production cycle that produce two to four collections a year, minimizing styles within a collections line, and lowering the production volumes of styles. This practice promotes sustainable production as well as more sustainable consumption as consumers are not pressured to buying clothes at every merchandise delivery. Currently, the apparel industry operates an unsustainably and unethically system as most business' goal is to find the cheapest labor, the cheapest materials, to over produce a garment that spurs over-consumption and creates damaging environmental cost (Brewer, 2019). However, consumers do not connect how fast fashion does not fully meet the functional, expressive, and aesthetic needs of most individuals as the current practices are impersonal, over inclusive, and often one-size-fits-all solutions. So, the call for restructuring the way the apparel industry conceives, constructs, designs, and produces apparel to successfully meet consumers' needs. This research shows that by defining a market, getting to know the user needs, and building personal relationships will promote a better-quality garment that makes people feel good and will endure for a lifetime of use.

Fourth, this study's findings contribute to academia research and academic departments in textiles and apparel design, product development, production, and retailing strategies. This research can inform future designers that there are people outside of the mainstream, overconsumption target market that seek out personal connections with those behind the

designing, making, and production of apparel. These consumers have specific wants and needs that desire a personal connection with a designer to meet those needs and provide custom, tailored pieces that are intentionally, carefully, and ethically made. The findings may also benefit future designers, product developers, and production members to understanding the need for creating more personalized apparel for consumers and create a long-lasting relationship with clients that build a strong connection that fosters trust and communication. This research contributes to the academic development of designer, product development, and production education as it provides a strong argument that supports the importance of semiotics in relation to fashion design and production that promotes stronger connections with designs, people, and products.

Fifth, the findings of this research have theoretical implications for C2C research in relation to eco-design and minimalist strategies. Eco-design and minimalist strategies have not been studied together as methods to implementing C2CAD and have been found to be a promising combination that supports the future development of sustainable practices. The study's findings add to the growing body of knowledge surrounding sustainable fashion in relation to product design and development. C2C research proved to be valuable when applied to fashion design, to explore methods, strategies, and designs that promote a closed-loop, circular life for apparel. The strategies that were valuable to implementing C2C were eco-design and minimalism. As eco-design focuses on creating a design plan, focused on recycled, circular, biodegradable materials and construction methods that promote functionality, minimalism further allows eco-design strategies to be utilized as it removes excess distractions during the design and production process that allows for better focus on eco-design and minimalist qualities that exemplify simplicity, innovation, and circularity which directly reflects C2CAD. Second,

this study supports and expands on McDonough and Braungart's (2003) research surrounding cradle-to-cradle design and how implementing their strategies within the apparel industry may be achieved. This research utilizes eco-design and minimalism as strategies to explore C2C design both from a theoretical and methodological approach – exploring how these strategies attach meanings that create a purpose before, during, and after the design and production of apparel. This research provides a deeper understanding of C2C practices that attach meaning and purpose to apparel both through intentional, conscious, thought-out design choices. Additionally, this research adds valuable insights to C2CAD research, which Gam and colleagues (2009) established the framework of, and the body of knowledge, another growing area in sustainable apparel research. This research provides strategies and theoretical framework that supports implementing these steps that has not been done in previous research.

The use of semiotics in this study has implications to future researchers in product design. Traditionally, semiotics has been used as an analytical tool, semiotics on design, and as a methodology, semiotics for design. However, in this study the use of semiotics for design allowed for semiotics to be viewed as a "mechanism" operating inside the design rather than a microscope to analyze the results of a design (Deni and Zingale, 2017). This theoretical framework provides further insight to the design and production processes and the meanings and purposes created and interpreted at each phase of the process. This helps to provide further insight on where these strategies can be used to implement C2CAD, how to implement C2CAD, and finally, why to implement C2CAD. There is a growing concern surrounding the fashion industry's harmful practices and utilizing eco-design and minimalist strategies to implement C2CAD provides solutions. When viewed through a theoretical lens, the application of semiotics provides better solutions with a deeper understanding of the meaning and purpose of apparel,

how to create these meanings, deeper understanding of the wearers needs, and deeper understanding of the world around us that shapes how we connect with apparel and connect with others through apparel.

Finally, this research may be valuable to government policy makers as previous research shows that there is a major issue with apparel production, consumption, and disposal that results in detrimental environmental impacts. These issues must be addressed, and the best start would be through creating and enforcing policies to regulate companies on the number of production cycles a season or a year. In research published in 2017 by Drew & Yehounme, fast fashion was producing up to 50 cycles a year – almost once a week. Currently in 2023, many of the large fast fashion brands produce about 52 "micro-seasons" a year—or one new "collection" a week (Stanton, 2023). Many of these large retailers now have bi-weekly deliveries of new merchandise, promoting this vicious overproduction practice which feeds overconsumption cycles (Stanton, 2023). The first, most effective way to slow this vicious cycle down would be to write policies to slow down production, restricting the number of cycles produced a year, restricting the number of styles in production, and restricting the number of deliveries of new merchandise to stores. This would slow down the environmental impact that is made every day by the apparel industry two-fold, while at the same time creating more conscious consumers.

## Limitations and Future Research

As with any research this study had certain limitations which gives way to potential future research. First, because of the exploratory nature of this research, the study's sample was limited to one case, therefore one fashion business. Future research could sample designers across several sustainable companies to validate this studies themes or potentially find other

practices that could help inform sustainable fashion design or implement C2CAD utilizing different strategies or a mixture of different strategies.

This research was limited in data collection methods of zoom interviews. Though zoom has been used for interview collection, triangulating with observation could have elicited even more valuable data. Future research could allow for observation time at the business and emerging the researcher in the day-to-day rhythm of a business. In addition, arranging time with participants was a challenge. Participants were extremely busy, time was tight for interviews and might not have been at the most convenient, spare time, resulted in rushed interviews. This could have affected participants responses as they did not have proper reflection time for their responses. Future research could factor in the time scarcity of fashion industry participants to better plan for data collection.

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## APPENDICES

A IN-DEPTH INTERVIEW PROTOCOL

| | | | |
|---|---|---|---|
| **Rapport Building/Demo Questions** | What is your name and where are you from?<br>How long have you been in the fashion industry?<br>What other job positions and/or education led to where you are today?<br>What is your current job title within your company? | | |
| **Central concepts** | **Types of questions to address each concept** | | |
| | **Core** | **Probing** | **Planned Follow-Up** |
| **RQ 1: How is C2C utilized in the fashion industry from a luxury fashion brand case perspective?** | | | |
| | **Core** | **Probing** | **Planned Follow-Up** |
| **Core Values** | Thinking on the mission and core values of MONO, what would be some words to describe the values of MONO. | How are the company's core values captured in the design process? | What 3 core pieces capture the companies' values to you?<br><br>What 3 cycle 2.22 pieces capture the core values to you? |
| **RQ 2: How does a fashion brand negotiate multiple design principles (design concept, sustainable materials and production, and color) when employing eco-design and minimalism design strategies when creating a new apparel line.** | | | |
| **Sustainability** | • In your own words, what does sustainability mean to you?<br><br>• Describe the ways you see sustainability in the values at your company [MONO].<br><br>• Tell me about the role sustainability plays in your design | • How has your view of sustainability changed over time, and in what ways has this changed your design approach? | • What is the most important sustainable component of the design and production process to you? |

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| | and production process. | | |
| **Eco-Design**<br><br>Conceptual Design Choices<br><br>Sustainable Materials and Manufacturing Processes<br><br>Chemical Processes and Color Choices | • Describe how nature plays a role in your design process.<br><br>• Tell me about what transformational and convertibility means to you and what it looks like for the design process.<br><br>• Tell me about your production and manufacturing process and how it looks different from other companies regarding sustainability.<br><br>• Tell me about the qualities of a material that are made to stand the test of time? | • Please describe your inspiration for FW 22 design elements and their importance.<br><br>• Describe the silhouettes, fabrics, and colors you believe to emulate timelessness?<br><br>• How do you determine the number of pieces in core as well as cycle collections?<br><br>• Describe any important qualities you look for when sourcing fabric and other materials and how you evaluate them based on your criteria. | • What cycle 2.22 pieces do you believe capture your values best?<br><br>• Tell me about what functionality looks like for your designs and why it is so important.<br><br>• Tell me about how you utilize deadstock or leftover fabric from previous collections in any way?<br><br>• What natural or environmentally friendly characteristics do you look for in fabrics and materials? |
| **Minimalism**<br><br>Conceptual Design Choices | • In your own words, what does minimalism mean to your design process.<br><br>• Describe what silhouettes or design details you have found successful | • What is the most important quality of a minimalist design to you?<br><br>• What core pieces do you believe capture these qualities best? | • Tell me about any correlation you see with minimalism and sustainability.<br><br>• What is the most important design detail or |

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|---|---|---|---|
| | when designing for stylized minimalism? | | characteristic of the core pieces. |
| Sustainable Materials and Manufacturing Processes | • Describe what an integrated approach looks like for your design and production process? | • What kind of knowledge do you seek when collaborating with other supply chain members? | • During pattern making and cutting, tell me about any strategies you utilize to reduce waste? |
| Chemical Processes and Color Choices | • Tell me about how a season's colors are selected or how does a season's color palette come to be? | • How do you utilize accent colors in your design details? | • Tell me about any patterns you have used in the past and how you selected them. |
| **RQ 3: What design strategies and practices can designer utilize to align with C2C when creating a capsule wardrobe apparel collection** | | | |
| C2C | • How is the end of life of a garment considered during the design process (i.e. how it can be recycled)? | • Are there specific materials, stiches, colors, or silhouette choices that have shown to prolong the life and number of wears of your garments? | • Tell me about the importance of designing pieces to be updated or customized?<br>• If you have ever practiced redesigning or upcycling of unsold or used pieces, could you tell me about the process? |
| **RQ 4: How does the meaning of sustainability through the lens of semiotics theory become attached to apparel through the designers' strategies and practices that are chosen during the design process?** | | | |
| What is the message you wish to convey through your designs?<br><br>Could you tell me about the strategies that you use to convey this message? | | What 2 core pieces best capture the message you wish to convey?<br><br>What 2 cycle 2.22 designs best capture your message? | |
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| What is the purpose you believe is created by MONO’s apparel? |

## B EMAIL RECRUITMENT

Letter to MONO:

Subject: Seeking participants for a research study on Cradle-to-Cradle Apparel Design

Hello,

My name is Carlee Stephens, and I am a graduate student in the department of Textiles, Merchandising and Interiors, working under the supervision of Dr. Laura McAndrews. I am seeking participants for my thesis research on implementing Cradle-to-Cradle apparel design (C2CAD) method using eco-design and minimalist principles. Your company, referred to as MONO for privacy, was selected as a great for this case study as your practices of slow fashion, multifunctionality, and stylized minimalism are imperative to identifying key elements of design and development processes that promote C2CAD.

I am writing to request access to your organization's email listserv so that I can contact potential participants for the study.

I will conduct interviews to learn more about how design and production methods used by MONO promote sustainability and utilize eco-design and minimalist principles.

These interviews will take place during the month of February to coincide with time restraints. They will take approximately 60-80 minutes to complete, and can be conducted in person or virtually, including via email, phone, or video conferencing (such Zoom or FaceTime). Each interview will take place in one sitting at a mutually agreed-upon time and location.

Participants do not need to be currently affiliated with MONO, but must be familiar and have experience with MONO.

Please contact me (carlee.stephens@uga.edu) or Dr. McAndrews (lauraemc@uga.edu) if you have any questions about the survey or research project. Thank you for your assistance!

Best,
Carlee Stephens

C STUDY CONSENT FORM

**UNIVERSITY OF GEORGIA**
**CONSENT LETTER**
**LESS DESIGN, BETTER DESIGN: A CASE STUDY IMPLIMENTING C2CAD MODEL USING ECO-DESIGN AND MINIMALISM**

Dear Participant,

My name is Carlee Stephens, and I am a student in the Family of Consumer Science Department at the University of Georgia under the supervision of Laura McAndrews. I am inviting you to take part in a research study.

I am doing research on implementing Cradle-to-Cradle apparel design (C2CAD) method using eco-design and minimalist principles. This research will be conducted through a case study of New York City based luxury fashion company, called MONO for privacy. MONO was identified as a great fit for this case study as MONO operates by minimizing design and production processes as well as minimizing their relationships to acquire quality, local relationships with the components of their integrated design and production process. Along with their integrated approach, MONO, is built on the core tenets of slow fashion, multifunctionality, and stylized minimalism which is imperative to identifying key elements of design and development processes that promote C2CAD. Limited scholarly research linking Cradle-to-Cradle apparel design and practice in the fashion sector exists. This research serves to address this gap by identifying the ideal practices that create a more sustainable future that connects the people, environment, and economy to rebuild an industry that is both environmentally and socially responsible.

I am looking for designers, creative director, production, and product development personnel with prior or current experience working for MONO. These individuals are invited to be in the study as they have the hands-on experience designing and developing collections for the brand, which will provide valuable information to the research.

If you agree to take part in this study, you will be asked to complete an interview. There will be 1 interview session. Each session will be 60-80 minutes and will be recorded over Zoom video conference.

Participation is voluntary. You can refuse to take part or stop at any time without penalty. The decision to refuse or withdraw will not affect receiving feedback or other benefits that will be provided.

Although highly unlikely, there may be questions that may make you uncomfortable. You can skip these questions if you do not wish to answer them.

Your responses may help us better understand the design and production process that, through this research, may be altered to better promote sustainable design practices and how to successfully implement C2CAD. Upon reflection and making discoveries after interviews, the

data collected will be used and combined with a product analysis to further understand the design process. Following this step, the researcher will use the discoveries to design a capsule wardrobe collection based off findings and research that implements C2CAD. These findings will be shared once completed to suggest any areas for sustainable improvement.

Your identity will remain anonymous and protected using pseudonyms and the same for the company. Research records will be labeled with study IDs that are linked to you by a separate list that includes your name as well as any records that include identifiers linked to products or other companies. This list will be destroyed once we have finished collecting information from all participants.

If you are interested in participating or have questions about this research, please feel free to contact me at 850-450-6010, cas36389@uga.edu.

Please keep this letter for your records.

Sincerely,

Carlee Stephens

# D IRB CORRESPONDENCE LETTER

UNIVERSITY OF GEORGIA

Tucker Hall, Room 212
310 E. Campus Rd.
Athens, Georgia 30602
TEL 706-542-3199 | FAX 706-542-5638
IRB@uga.edu
http://research.uga.edu/hso/irb/

Human Research Protection Program

**NOT HUMAN RESEARCH DETERMINATION**

February 22, 2023

Dear Laura Mcandrews:

On 2/22/2023, the Human Subjects Office reviewed the following submission:

| | |
|---|---|
| Title of Study: | Exploring C2CAD design practices |
| Investigator: | Laura Mcandrews |
| Co-Investigator: | Carlee Ann Stephens |
| IRB ID: | PROJECT00007010 |
| Funding: | None |

We have determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations. This scholarly activity is designed to study a specific process from the perspective of key informants in the profession.

University of Georgia (UGA) IRB review and approval is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human subjects, please submit a new request to the IRB for a determination.

Sincerely,

Kimberly Fowler, Director
Human Subjects Office, University of Georgia