

THESIS

IF I CUSTOMIZE IT, I WILL KEEP IT LONGER? SEGMENTING MASS CUSTOMIZATION CONSUMERS THROUGH THE SUSTAINABILITY LENS

Submitted by

Jessica R. Shaver

Department of Design & Merchandising

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Spring 2021

Master's Committee:

Advisor: Ruoh-Nan Yan

Sonali Diddi

Rebecca Niemiec

Copyright by Jessica Rae Shaver 2021

All Rights Reserved

ABSTRACT

IF I CUSTOMIZE IT, I WILL KEEP IT LONGER? SEGMENTING MASS CUSTOMIZATION CONSUMERS THROUGH THE SUSTAINABILITY LENS

Mass customization (MC) refers to the manufacture of customized products on a mass basis at prices similar to mass-produced (MP) goods (Davis, 1996). Mass customized apparel (MCA) products can better address consumer needs through the consumer-centric process (Yang, Kincade & Chen-Yu, 2015). Additionally, MCA has been heralded for its ability to reduce waste throughout the supply chain, most notably through the elimination of deadstock (e.g., Boër, Redaelli, Boër, & Gatti, 2018), and is suggested to offer the potential for more sustainable consumer behavior through an emotional bond formed with the customized product (Mugge, Schoormans, & Schifferstein, 2009) that may lead to increased product longevity. The purpose of this thesis was to explore the current MCA consumer market and investigate potential connections among MCA consumer segments regarding sustainability related variables. Specifically, this study utilized actual MCA consumers' purchase patterns (i.e. *frequency of MCA purchase, amount of MCA purchase, and duration of MCA purchase behavior*) to identify consumer segments and profile this emerging market to better understand their MCA-specific *motivations for MCA purchase and satisfaction with the MCA product and customization experience* as well as demographic variables (i.e., *income, education, and body mass index (BMI)*). Additionally, this study aimed to uncover to what extent they may display sustainability-related variables (i.e., *emotional product attachment and environmental attitudes*) and behaviors (i.e., *sustainable apparel behaviors and general sustainable behavior*).

To address this purpose, an online consumer survey was distributed in Spring 2019, and 318 usable responses were analyzed using the segmentation framework. Two clusters were identified who differed mainly on the duration of their MCA purchase behaviors; *new customizers* (n = 243) had an average of 2 years of experience as MCA consumers, while *experienced customizers* (n =75) had on average 9 years of experience purchasing MCA. T-test comparison, multiple regression, and correlation analyses were conducted to explore the characteristics of the clusters. Findings showed a general trend among experienced customizers for stronger motivations and satisfaction, as well as increased environmental attitudes, and more sustainable apparel behaviors and general sustainable behaviors. Interestingly, regression analysis revealed participants' who were interested in making sustainable pre-purchase apparel decisions, such as purchasing apparel made of organic materials were likely to be less satisfied with the MCA products and experience. Both new and experienced customizers reported intentions of keeping MCA products longer than MP apparel, and a significant difference between clusters found experienced customizers intended to keep their MCA product a year longer than new customizers; suggesting MCA maybe a sustainable alternative for consumers. This thesis concludes with a discussion of theoretical and managerial implications as well as suggestions for future research for this promising topic.

ACKNOWLEDGEMENTS

This thesis was made possible by the Oris Glisson Fellowship, granted by the International Textiles and Apparel Association (ITAA), without which data collection would not have been possible. The insights and inspiration I gained from membership in ITAA sparked my curiosity and motivated me to complete my graduate work and will continue to guide my future endeavors in all areas of apparel and textiles research and exploration. The members of ITAA are kismet spirits and I am continually awed by the power of their intellectual passions.

I must acknowledge the support and guidance provided by my advisor, Ruoh-Nan (Terry) Yan, PhD., whose patience and ability to focus my thoughts contributed more than words can express to the successful completion of this document. Thank you, Dr. Yan for steering me away from rambling and towards clarity. I would also like to express deepest gratitude to my committee members, Sonali Diddi, PhD. and Rebecca Niemiec, PhD. Thank you, Dr Diddi for always pushing me towards perfection and accuracy in how I express and present my thoughts. Thank you, Dr. Niemiec for providing perspective beyond my areas of knowledge and seeing the value of my work beyond my own vision. Thank you all, for agreeing to be part of this journey.

Additionally, I would like to thank the entirety of the Department of Design and Merchandising at Colorado State University. Pursuing a graduate degree was not even on my radar until meeting Dr. Ogle in the summer of 2017, and although I took the long road to completion, I believe pursuing this course is one of the best decisions I have ever made. I was blessed to work for and alongside inspiring individuals every day, learning from their passions and processes. Thank you, Dr. Park, Dr. Sparks, Dr. Hyllegard, Dr. Ogle, Dr. Morris, Dr. Malinin, Sandra, Kendra, Dr. Knowles, Megan, and Doreen. Thank you to Jennifer and Kevin

for always finding time for me. Thanks to David, Rebecca, Sarah, Kate, Kayna, and Brittany for providing stimulating conversations and stress-relieving shenanigans that engaged my procrastination in the best ways possible. Thanks to Morgan who unknowingly helped me find this topic. Further, I would like to acknowledge and pay tribute to Joy, who helped me navigate various aspects of graduate school life, even when she would rather not have been needed.

Finally, thank you to my family and friends. My mother who provided her time, energy, and resources to listening, editing, and cheer-leading, and my father who was there to empathize on the trials and tribulations of conducting data collection and analysis. Thank you, Alta, Kat, and Marie for letting me vent. Thank you to Merrie for helping me practice. And thank you, Jorge, my love. Your unwavering support of me and my dreams make it all possible. Thank you for moving for me (three times!). Thank you for making sure I eat, that our bills are paid, and the dishes are clean. Thank you for agreeing to join me on this adventure that is life.

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
DEFINITION OF TERMS.....	x
CHAPTER I – INTRODUCTION.....	1
Justification.....	1
Purpose.....	6
Conceptual Framework.....	7
Potential Contributions.....	10
CHAPTER II – LITERATURE REVIEW.....	11
Market Segmentation Framework.....	12
Issues with Mass Production (MP).....	14
Mass Customization (MC) & Mass Customized Apparel (MCA).....	18
MCA Specific Consumer Characteristics.....	24
Mass Customized Apparel (MCA) From A Sustainability Perspective.....	28
Sustainability-Related Variables.....	31
Demographics.....	36
In Summary.....	39
CHAPTER III - METHODS.....	41
Sampling Procedure.....	41
Survey Instrument.....	44
Pilot test.....	48
Data Collection.....	48
Data Screening and Consolidation.....	49
Data Analysis to Address Research Question One.....	53
Data Analysis to Address Research Question Two.....	55
CHAPTER IV – RESULTS.....	56
Profile of the Participants.....	56
Final Factor Analysis.....	66
Participant Group Means for Variables of Interest.....	71
Cluster Analysis for Research Question One.....	73

Cluster Details and Comparisons.....	76
Analysis for Research Question Two.....	81
Ancillary Analyses.....	85
CHAPTER V – DISCUSSION.....	91
Research Question One.....	91
Research Question Two.....	99
CHAPTER VI – CONCLUSIONS.....	105
Theoretical Implications.....	105
Managerial Implications.....	107
Limitations & Future Research.....	110
REFERENCES.....	114
APPENDIX A – RESEARCH INSTRUMENT INVITATION LETTER.....	127
APPENDIX B – SURVEY INSTRUMENT.....	128
APPENDIX C – MULTI-GROUP FACTOR ANALYSIS RESULTS.....	138
APPENDIX D – CROSSTABULATION TABLES.....	141
APPENDIX E – CLUSTER ANALYSIS DENDROGRAM.....	144
APPENDIX F – FULL CORRELATION TABLE RESULTS.....	145

LIST OF TABLES

<i>Table 1. Segmentation Model for Proposed Thesis</i>	9
<i>Table 2. Non-Apparel MC Key Literature</i>	20
<i>Table 2, cont'd. Non-Apparel MC Key Literature</i>	21
<i>Table 3 Key MCA Literature.....</i>	23
<i>Table 3, cont'd. Key MCA Literature</i>	24
<i>Table 4. Descriptive Statistics of Participant Demographics (n=318)</i>	57
<i>Table 5. Participants' MCA Purchase Experience and General Apparel Purchase Behaviors ..</i>	58
<i>Table 6. Cross-tabulation for IPP by Duration of MCA Purchases.....</i>	61
<i>Table 7. Factor Analysis and Scale Reliability for Motivation Variable</i>	67
<i>Table 8. Factor Analysis and Scale Reliability for Satisfaction Variable</i>	68
<i>Table 9. Factor Analysis and Scale Reliability for Emotional Product Attachment Variable</i>	68
<i>Table 10. Factor Analysis and Scale Reliability for Environmental Attitudes Variable</i>	69
<i>Table 11. Factor Analysis and Scale Reliability for Sustainable Apparel Behaviors</i>	70
<i>Table 12. Factor Analysis and Scale Reliability for General Sustainable Behaviors Variable ...</i>	71
<i>Table 13. Descriptive Means for Participants on Key Variables of Interest (n=318)</i>	73
<i>Table 14. Ward's Method Hierarchical Cluster Analysis, partial Agglomeration Schedule.....</i>	74
<i>Table 15. Final cluster centers from k-means cluster analysis</i>	75
<i>Table 16. Descriptive Statistics of Two Cluster Solutions; Demographics</i>	77
<i>Table 17. Independent samples t-test of participant clusters on MCA purchase patterns</i>	78
<i>Table 18. Independent samples t-test of participant clusters on key variables of interest</i>	79
<i>Table 19. Independent samples t-test of clusters and additional variables of interest.....</i>	80
<i>Table 20. Multiple Regression Analysis Set One, Frequency as dependent variable.....</i>	82
<i>Table 21. Multiple Regression Analysis Set Two, Amount as Dependent Variable</i>	83
<i>Table 22. Multiple Regression Analysis Set Three, Duration as Dependent Variable.</i>	83
<i>Table 23. Multiple Regression Analysis Set Four, Motivation as Dependent Variable</i>	84
<i>Table 24. Multiple Regression Analysis Set Five, Satisfaction as Dependent Variable.....</i>	85
<i>Table 25. Pearson correlation table, all participants, significant demographic variables.....</i>	86
<i>Table 26. Pearson (2-tailed) correlation table comparison of clusters, variables of interest.....</i>	90

LIST OF FIGURES

<i>Figure 1. Segmentation Model Visualization.....</i>	40
<i>Figure 2. Distribution of Participants' MCA Purchase Frequency</i>	59
<i>Figure 3. Distribution of Participants' Amount of MCA Purchases</i>	60
<i>Figure 4. Distribution of Participants' Duration of MCA Purchase Behavior</i>	60
<i>Figure 5. MCA Retailers Purchased from by Participants.....</i>	63
<i>Figure 6. MCA Products Purchased by Participants</i>	63
<i>Figure 7. Participants' Reasons for MCA Purchases</i>	64
<i>Figure 8. Participants' Average 6-month General Apparel Expenditures (N=318).....</i>	65
<i>Figure 9. Participants' Average 6-month General Apparel Items Purchased (N=318)</i>	65
<i>Figure 10. Cluster placement using final segmentation basis</i>	75
<i>Figure 11. Cluster One: Intention to keep MCA products, (n=243)</i>	81
<i>Figure 12. Cluster Two: Intention to keep MCA products, (n=75)</i>	81

DEFINITION OF TERMS

BMI – Body mass index (BMI) is a ratio of weight and height used to determine general healthiness (or fatness) (Center for Disease Control and Prevention, 2017).

Co-design – “a catch-all term to embrace participatory design, metadesign, social design and other design approaches that encourage participation...co-design offers an opportunity for multi-stakeholders and actors to collectively define the context and problem...requires mutual learning between the stakeholders/actors” (Faud-Lake, 2014, p. 147).

Emotional product attachment – The connection that is formed between an individual and a consumer product (Park & Yoo, 2018).

Environmental attitudes – How one views human activities in relation to ecological issues, and the degree to which a consumer feels a moral or ethical obligation to behave in an environmentally responsible manner (Dunlap, Van Liere, Mertig, & Jones, 2000; Razzaq, Ansari, Razzaq, & Awan, 2018)

Mass Customization (MC) – The manufacture of customized products on a mass basis at a price comparable to standardized and mass-produced (ready-made) products (Davis, 1996; Pine et al., 1993; Wang et al., 2016).

Mass Customized apparel (MCA) – Apparel that has been customized by (or for) the end-user to meet individual specifications and preferences (Lee & Moon, 2015).

Mass Production (MP) – Products that are designed and produced for the average consumer in large quantities before the consumer indicates an actual need, often leading to excess products that remain unsold (Boër et al., 2018).

MCA purchase patterns – Purchase patterns that will be considered by this research include the frequency (e.g., how often one purchases), the amount (e.g., how many items are purchased), and the duration of their MCA purchase behavior (e.g., how long have been buying MCA products).

Motivations for MCA purchase – Motivations are the reason or reasons for behaving in a certain way and are influenced by an individual's internal needs and external stimuli; consumer motivations are those factors that influence purchase behaviors and have been conceptualized as including several dimensions including, anticipated utility, choice optimization, and sensory stimulation from the marketplace itself (Westbrook & Black, 1985). In an MCA context, consumer motivations believed to influence behavioral intentions include factors related to product and process benefits, such as a unique, self-representative, or functional product, and the hedonic pleasure of helping to create your own apparel (Merle et al., 2010).

Satisfaction – Satisfaction in consumption results from the expectations conceived within the consumer's cognitive functions and is impacted directly and indirectly by attributes of product performance as well as attributes associated with the consumption experience (Oliver, 1993).

Sustainable apparel behaviors – Consumer behaviors relating to the consumption, maintenance, and disposal of apparel items that minimizes the environmental impact of the product and processes, such as, reduced consumption, choosing more durable products, maintaining/repairing clothes, and disposing in an environmentally responsible manner (Kunz, Karpova, & Garner, 2016).

Sustainable consumer behaviors – Behaviors related to the purchase, use, maintenance, and disposal of consumer goods that minimize environmental impacts (Kunz et al., 2016), such as reduced consumption, recycling, composting, conserving water and energy, and taking public transportation.

CHAPTER I – INTRODUCTION

Justification

Customization implies individuality and involves some degree of being made-to-order. Mass customization (MC) refers to the manufacture of customized products on a mass basis at a price comparable to standardized and mass-produced (ready-made) products (Davis, 1996; Pine II, Victor, & Boynton, 1993; Wang, Zhang, Sun, & Zhu, 2016). Davis (1996) noted that mass customization may occur at different stages of production including design, fabrication, sale, and delivery. MC can mean using standardized (modular) parts that can be chosen individually to create a custom product; MC can also mean totally custom-made without the use of standardized parts (Ulrich, Anderson-Connell, & Wu, 2003). Mass customized products benefit the retailer for their ability to eliminate markdowns and inventory (Yu & Park, 2014) and benefit the consumer for the customized product's ability to provide a unique product that meets individual needs (Fornasiero, Macchion, & Vinelli, 2015; Park & Yoo, 2018). Although MC can be seen across product and service industries today, for example customized cars, computers, and cell-phone service plans, it is perhaps not the “commonplace” paradigm Stan Davis first envisioned when the concept of mass customization first made headlines (Davis, 1996).

Customization, in the context of clothing, was the predominant model of production until the rapid industrialization of the 19th century brought about the concepts of ready-made (Zakim, 2003) and ready-to-wear (Funderburk, 1994), and ultimately, the evolution and expansion of the mass production (MP) model. Even though MP replaced custom-made apparel for most daily wear needs (Fralix, 2001), customization has remained in smaller apparel markets of mostly hand-made garments, such as haute couture (McNeil, 2011), the high-end tailors of Saville Row (Shih & Agrafiotis, 2017), and other specialty occasion apparel that continues to find demand for

one-of-a-kind (but also, often single-use) apparel. However, “not to be confused with custom-made, mass customized products may still be manufactured in relatively large quantities” and may be limited by the skills of the garment workers and setup of production facilities (Fralix, 2001, p.3). Further, mass customization may not mean a product is totally customizable; options for customization are pre-determined by the retailer (Senanayake & Little, 2010), but the final product is created based on the individual customer’s needs (Fralix, 2001). Today, innovative apparel production technologies and flexible manufacturing systems (Gerber Technology, 2016), like virtual prototyping software (Optitex. n.d.), digital fabric printers (Fralix, 2001), and even whole garment printers (Buecher, Gloy, Schmenk, & Gries, 2018) afford a streamlined customization process allowing product categories like jeans, t-shirts, blouses, skirts, and trousers to expand the customized apparel market beyond luxury and special occasions, to daily wear and the mass market (Nayak, Padhye, Wang, Chatterjee & Gupta, 2015).

Mass customized apparel (MCA) is believed to offer the consumer a truly unique (Fiore, Lee, & Kunz, 2004) and functional product (Franke & Schreier, 2010) that provides the shopper with a feeling of creative achievement (Trentin, Perin, & Forza, 2014). MCA also offers a more inclusive design appealing to shoppers with more diverse body shapes and sizes (Hawa, 2018), or those who have concerns about the fit of standard sizes available in ready-made products (Michel, Kruezer, Kühn, Stringfellow, & Schumann, 2009). Presently, many MCA products are sold online using an interactive co-design process that enables consumers to customize pre-designed styles, at retailer selected points of customization, such as fabrication (i.e., materials and/or pattern), fit, features (i.e. pockets, cuff or collar style), and design (i.e. neckline shape, sleeve styles, skirt or trouser shapes) (e.g., eShakti, n.d; Frilly, n.d; Proper Cloth, n.d.). What

customizations are offered, and how the co-design process is displayed and completed often vary between MCA retailers (Senanayake & Little, 2010).

Some consumers consider this new online shopping experience for apparel customization to be potentially risky due to the additional efforts (time) required to customize the product, uncertainty about how to return/exchange customized goods, and security or privacy concerns over sharing personal data (Lee & Moon, 2015). Others have considered how the online customization platform (also referred to as an interface or configurator in the literature) may influence consumers' experience (e.g., de Bellis, Hildebrand, Ito, Herrmann, & Schmitt, 2019; Trentin et al., 2014). Despite these consumer risks, the MCA market has been steadily growing over the past decade as firms practicing customization continue pushing the paradigm further.

A 2010 survey of established apparel firms that sell both MP and MC products reported annual revenues of less than \$10 million for the MC products at most of the companies (Senanayake & Little, 2010), suggesting that the MC products are more recent additions to already established brands making an initial entrance into the MC market. See for example, Nike and their customization platform Nike by You (Nike, n.d.). In apparel, the unchanging shapes of men's suiting has allowed firms like Brooks Brothers and Land's End to introduce MCA to their customers through the traditional styles like the button front shirt and polo, which can be moderately modified by the consumer in regards to fit (traditional, modern, slim); style features such as pocket, cuff, and collar details; or trim details such as button and thread color, and fabrication (Brooks Brothers, n.d.). Custom t-shirt retailers have also proliferated in this new era of MC. Most of these retailers (i.e. Zazzle, Custom Ink) customize the t-shirt only through graphic embellishment, the garments themselves pre-purchased from ready-made stock (Custom Ink, n.d.b). These MCA products have seen more steady success than products that are

more impacted by fit issues like jeans; in 2018 Levi's launched its latest (fourth) version of customization (Unzipped, 2018), following previous attempts like Original Spin and Curve ID which were both shut down within five years of launching (McGregor, 2014; Piller, 2005). Also in 2018, Adidas introduced a prototype for in-store on-demand production of customized merino knit wear (Buecher et al., 2018) showing the potential of continued innovation in the realm of MC.

Today we find a variety of MCA products available online for women and men. For example, companies like eShakti and Sumisurra specialize in women's apparel (Chirico & Rose, 2017), while mobile-based (app) mTailor started in men's suiting and business wear, and expanded into men's and women's jeans (mTailor, n.d.). Another unique MCA retailer - Frilly, is one of the few that promotes sustainability (i.e. reduction of waste) as one of the benefits of the made-to-order production model (Shatzman, 2017). Specializing in women's work-appropriate apparel, or what would otherwise be called ready-to-wear (RTW), Frilly's online store uses 3D rendering technology as part of the customization platform, allowing consumers to see what the product they are designing will look like with the customizations they have selected. 3D body scanning is another technology that has been used to enhance the MC paradigm for apparel design (Fralix, 2001). mTailor uses a proprietary technology to body scan consumers in their own space using their smartphone camera – a process the brand claims is more accurate than a professional tailor (mTailor, n.d.). Advances in body scan and 3D technologies are expected to continue improving user-experience and the fit customization point (Senanayake & Little, 2010), which will help positively influence the adoption of MCA by consumers and producers.

However, minimal research has explored the existing MCA consumer population, with most MC consumer research generally limited by the use of convenience samples in university student populations (see for example, Cho & Wang, 2010; Frank & Schreier, 2010; Kamali & Loker, 2002; Wan, Wang, Zhang, & Cao, 2017). Although this demographic does represent a likely consumer group of MCA products, none of these studies have measured previous experience with MCA explicitly. The few studies that have sampled non-student populations have been small in scale (Hawa, 2018, n=13) or lacking representative samples (Michel et al., 2009; Park & Yoo, 2018) making the findings difficult to generalize. These early investigations of likely consumers have helped develop what is known about potential consumer motivations, but there is a gap in the literature linking these motivations to actual purchase behaviors. To date, only one study has been conducted with actual consumers of customized apparel. Larsson (2012) conducted a mixed-methods analysis of Swedish consumers who had purchased customized knitwear at a physical store offering the service and found a majority of the consumers would not fit in standard sizes available in store. However, this early research was limited in sample size (eight qualitative interviews, and 37 purchase orders for quantitative data) and scope. Further, Larsson's (2012) research has yet to be followed up with more expansive knowledge of MCA consumers. This thesis expands upon previous MCA research by using market segmentation to identify groups of US-based MCA consumers based on their previous MCA purchasing behaviors; profiles of identified segments are developed and compared and provide managerial and theoretical implications.

Additionally, MC production is believed to offer ecologically sustainable benefits compared to the traditional mass-production model (Boër et al., 2018; Nayak et al, 2015). Although MC research has been conducted since the late 1980s, literature examining the

relationships between MC and sustainability is still in the early stages of inquiry (Hankammer, Antons, Kleer, & Piller, 2020). According to Gembarski, Schoorman, Schreiber, Knackstedt and Lachmayer (2018), ecological sustainability of MC has been the most overlooked topic in an already limited area of study. However, extant literature has suggested that MC production offers the ability to reduce waste across the supply chain by eliminating *deadstock* (Boër et al., 2018; Lehmann et al., 2018). Deadstock are the unsold goods that remain at the end of the season after all the markdowns and clearance sales (the excess unsold inventory) or the bulk yardage that was ordered from raw materials but never produced to completion. The implied made-to-order process of MC production removes the wasted energy and water consumption of over-production and eliminates deadstock because goods are not produced until they have been requested and sold. In addition to these sustainable production benefits, the MC product has been shown to increase emotional product attachment (Park & Yoo, 2018), which in turn, may result in more sustainable use, maintenance, and disposal behaviors (Niinimäki & Hassi, 2011). However, to date, no research has set out to explore possible links between MC product consumption and sustainability. To the author's knowledge, this thesis was the first empirical investigation to consider MC and sustainability in an apparel-specific context by examining possible relationships between MCA purchase patterns and other sustainability-related variables.

Purpose

The purpose of this thesis was to explore the current MCA consumer market and investigate potential connections among MCA consumer segments regarding sustainability related variables. Specifically, this study aimed to examine MCA consumer profiles through segmentation on the basis of MCA purchase patterns (i.e., frequency, amount, and duration) and to uncover if MCA consumers demonstrated sustainability related affective responses (i.e.,

emotional product attachment (Cho, Gupta & Kim, 2015)) and behaviors (i.e. sustainable apparel behaviors and general sustainable behaviors). Guiding these objectives were two research questions:

RQ1: Who is the contemporary MCA consumer regarding characteristics such as *motivations for MCA purchase, satisfaction with the MCA product and customization experience, and demographics (i.e., income, education, body type/BMI)?*

RQ2: To what extent are sustainability-related variables such as *emotional product attachment, environmental attitudes, and sustainable consumer behaviors (i.e., sustainable apparel behaviors, general sustainable behaviors)* displayed by MCA consumers and how might these variables influence their MCA purchase patterns and characteristics?

Conceptual Framework

Because little is known about this MCA consumer population, a market segmentation framework (Dolnicar, Grün & Leisch, 2018) was incorporated for this study. Rooted in marketing and economic theory (Smith, 1956), segmentation enables the inclusion of diverse descriptors (Wind, 1978) that will allow both research questions to be addressed by building robust consumer profiles that consider the MCA experience and sustainability-related variables. This exploratory investigation used purchase patterns (i.e., frequency, amount, and duration) as the basis for segmentation; a method cited by Omar (1999, as cited in Ratcliffe, 2017) as ideal in retail markets for exploring loyalty behaviors. Descriptor variables for this thesis included general demographic characteristics (i.e., *income, education, body type/BMI*), as well as specific characteristics relevant to the MCA experience (*motivations for MCA purchase and satisfaction with the MCA product and customization experience*) and variables relating to a sustainable

consumer mindset (*emotional product attachment, environmental attitudes, and sustainable consumer behaviors*).

Consumer characteristics included in the present research as descriptor variables are derived from a review of literature examining topics related to apparel, mass customization, and sustainable consumer mindsets and behaviors. These characteristics include *motivations for MCA purchase*, which include the more hedonic, such as the unique (Kang & Kim, 2012; Michel et al., 2009) and self-expressive product (Merle, Chandon, Roux, & Alizon, 2010; Wan et al., 2017), the exciting experience (Fiore et al., 2004), or sense of creative achievement (Schreier, 2006). More utilitarian motivations might be driven by atypical consumer needs (e.g., Hawa, 2018; Larsson, 2012). While motivations address the pre-purchase stage of the MCA decision making process, *satisfaction with the MCA product and customization experience* focuses on the MCA consumers' post-purchase evaluation of the product itself as well as the experience using the MCA platform. Including these variables enabled the development of robust consumer profiles that provide market implications for apparel and textile firms. Relating to environmental sustainability, *emotional product attachment* and *environmental attitudes* provide attitudinal measures, and *sustainable apparel behaviors* and *general sustainable behaviors* provide additional insights to understand the extent to which MCA consumers display sustainability-related variables. Finally, general demographic descriptors (i.e., *income, education, body type/BMI*) provide in-depth understanding of the current MCA consumer market. See Table 1.

Segmenting on the basis of MCA purchase patterns was considered appropriate for this thesis given the interest in sustainable consumer behaviors and the underlying notions of reducing consumption and increasing products' useable life being two main ways to be a more sustainable consumer (Harrabin, 2019). Using purchase patterns as a base for market segments

Table 1. Segmentation Model for Proposed Thesis

Basis	Specific Descriptors		General Descriptors	
<i>Purchase Patterns</i>	<i>MCA</i>	<i>Sustainability</i>		<i>Demographics</i>
<ul style="list-style-type: none"> • Frequency of MCA Purchases 	<ul style="list-style-type: none"> • Motivations for MCA Purchase 	<ul style="list-style-type: none"> • Emotional Product Attachment 	<ul style="list-style-type: none"> • Sustainable Apparel Behaviors 	<ul style="list-style-type: none"> • Income • Education
<ul style="list-style-type: none"> • Amount of MCA Purchases 	<ul style="list-style-type: none"> • Satisfaction with the MCA Product & Customization Experience 	<ul style="list-style-type: none"> • Environmental Attitudes 	<ul style="list-style-type: none"> • General Sustainable Behaviors 	<ul style="list-style-type: none"> • Body Type /BMI
<ul style="list-style-type: none"> • Duration of MCA purchase behavior 				

allows for the exploration of differences between and among consumer groups and may reveal links between MCA purchase patterns and consumer characteristics. For example, it might be assumed that consumers who shop for MCA frequently or purchase large amounts of MCA during a purchasing experience would be less likely to exhibit sustainable behaviors. However, high frequency MCA consumers may have functional needs, such as an atypical body size (Hawa, 2018; Larsson, 2012), that are not addressed by mass-produced apparel and therefore may consume less apparel overall than someone who purchases MCA infrequently and for the hedonic benefits of the fun customizing experience. The duration of the relationship with MCA products (or how long the consumer has been purchasing MCA) is important to this research as it is the author’s assumption (based on a review of the literature) that satisfied long-term MCA consumers are more likely to exhibit higher levels of emotional product attachment (Park & Yoo, 2018) and thus may behave more sustainably towards their apparel through increased product longevity (Baxter, Aurisicchio, & Childs, 2015; Niinimäki & Hassi, 2011) without necessarily being aware of sustainable benefits of such behavior. This study explored these variables to further understand whether and how MCA consumption may be connected with the notion of sustainability from a consumer perspective.

Potential Contributions

To the researcher's knowledge, this thesis was the first empirical study of MCA consumers in the United States. It advances and expands upon previous MCA literature and provides suggestions to guide future MCA consumer research. By adopting a sustainability perspective, this study the first empirical research to consider MCA as a potential sustainable alternative to apparel consumption, adding to the literature of this emerging topic of interest (Hankammer et al., 2020) and expands on this topic by examining segments of MCA consumers for potential sustainability connections. Additionally, the market profiles created from this thesis provide managerial implications for existing and potential MCA firms, especially in consideration of how MCA may be incorporated to address firms' corporate sustainability goals.

CHAPTER II – LITERATURE REVIEW

This research aims to provide support for the mass customization (MC) model as a sustainable alternative to the current mass production (MP) model from an apparel consumer perspective by using a segmentation framework to address two main objectives: (1) identify MCA consumers relating to their *motivations for MCA purchase, satisfaction with the MCA product and experience*, and demographics; and (2) investigate the extent to which sustainability-related variables (i.e., *product emotional attachment, environmental attitude, sustainable apparel behaviors, and sustainable general behaviors*) are displayed among MCA consumers and whether these variables may influence MCA purchase patterns and characteristics. This chapter provides a discussion of relevant literature starting with a review of the market segmentation framework, and the environmental issues associated with the mass-production model and innovations in the industry that enable MC production. An overview of the mass customization model will lead to sections reviewing what is known about the MCA-specific descriptors of interest to this study (motivations and satisfaction), why mass customization is considered a sustainable production alternative, the sustainability related descriptors (*emotional product attachment, environmental attitudes, and sustainable consumer behaviors*), and finally demographic factors (*income, education, body type/BMI*) of interest to the present research. The literature review will conclude with a review of the conceptual model and discuss why the proposed segmentation variables (i.e., *frequency of MCA purchase, amount of MCA purchases, and duration of MCA purchase behaviors*) are relevant to the objectives of the present thesis.

Market Segmentation Framework

This study used market segmentation theory (Smith, 1956) in order to understand the contemporary MCA consumer market using their MCA-specific purchase patterns. Purchase patterns were mentioned by Wind (1978) as useful variables for achieving a general understanding of the market, which is the first objective of this research. More recently market segmentation has been identified as useful in the retail sector, as consumers' purchase behaviors determine the products developed for market (Omar, 1999 as cited in Ratcliffe, 2017). Omar (1999, as cited in Ratcliffe 2017) recommended store loyalty criteria (e.g., heavy user, and regulars) as among the most important bases for retail segmentation.

Previous MC researchers have used a segmentation framework to identify potential consumers (or non-consumers) of MC products. Endo and Kincade (2008) in seeking to identify potential MC consumers found three groups: those who are not interested in product customization, those who are interested in both MC and MP products, and those who have needs that can be addressed with MC products (e.g., design and fit). Expanding on this segmentation of the MC consumer market, Michel et al. (2009) used specific consumer motivations to purchase MC as a basis for segmentation and found support for the apathetic MC consumer (Endo & Kincade, 2008), as well as three distinct groups, each motivated by different or various factors. One group of consumers was motivated by the desire to overcome negative attributes of standardized products, while another was motivated by a desire for a unique product and the use of the product for self-presentation, and the third group was motivated by all three motivations (Michel et al., 2009). Unfortunately, the authors' sample was not explicitly MCA consumers, and the authors did not include or discuss inclusion of a measure asking participants if they had any such prior experience. Therefore, this thesis will help to further expand our understanding of

the MCA consumer market and can be discussed in regard to these previous motivation-based findings.

More recently in a small qualitative study of Canadian apparel consumers interested in custom apparel, Hawa (2018) segmented apparel consumers on the basis of their shopping type (i.e., hedonic or utilitarian) and social dress tendency (i.e., to dress with the group or to dress as an individual) in order to understand their intentions to purchase MCA products. Perhaps most notably, the author found that those who dress to fit in with peers were more willing to pay and wait than those who dress to stand out as an individual. This finding suggests uniqueness may be a less strong driver for MCA consumption than more functional needs individual like overcoming the negative attributes of standardized products (e.g., poor fit, quality) (e.g., Larsson, 2012; Michel et al., 2009).

Applying the sustainability lens, previous segmentation research has identified socially responsible teenage apparel consumers (Ogle, Hyllegard, Yan, & Littrell, 2014) and sustainably conscious food consumers (Verain, Sijtsema, & Antonides, 2016) using product attribute importance as bases for segmentation. Consumer behaviors have been used as bases to identify eco- and social-oriented consumer groups, with segments revealing differences in demographic characteristics like income and education (Saleem, Eagle, & Low, 2018; Sarti, Darnall, & Testa, 2018), highlighting the benefits of segmentation in developing robust understanding of consumer characteristics. With consideration of the apparel industry and the current consumer trend towards over-consumption, Gwozdz et al., (2017) identified apparel consumer segments based on the amount and frequency of apparel purchases, and the type of apparel purchased (e.g., budget, fast fashion, better-luxury). The authors used the characteristics of the identified segments to develop interventions tailored to each group encouraging more sustainable

consumption behaviors and promoting participation in alternate forms of apparel consumption than traditional mass-production retailers (Gwozdz, Nielsen, & Müller, 2017).

Issues with Mass Production (MP)

Mass production (MP) has been the dominant manufacturing model in the apparel industry since the mid-nineteenth century when the ability to produce large volumes of standardized products at low costs was born out of the innovations and growing consumer demand of the Industrial Revolution; shifting the apparel industry away from the custom-made paradigm (Fralix, 2001; Zakim, 2003). Standardization in the apparel industry enabled more consumers to take part in the world of fashion (Fralix, 2001), and the idea of democratizing fashion is one that would eventually spur the growth of the fast fashion model (Crofton & Dopico, 2007). Today, the fast fashion model is understood as promoting a “throwaway culture” (Bhardwaj & Fairhurst, 2010), but the notion of disposable clothes pervades the history of ready-made—the first ready-made (mass produced) garments were produced for sailors to last one sailing season before needing to be replaced (Zakim, 2003). While ready-made and mass produced apparel opened the market to all consumers, today we understand the environmental toll of clothes as including harmful chemicals used in production (e.g., Choudhury, 2014; Williams & Mazzotta, 2017), overproduction—a side-effect of mass production (Allwood, 2018; Boër et al., 2018), and a wasteful consumer culture of disposability (Bhardwaj & Fairhurst, 2010; Claudio, 2007). These harmful environmental impacts have been covered by academic, industry, and popular media sources for at least two decades (e.g., Claudio, 2007; Fletcher, 2014; Williams & Mazzotta, 2017; Ross & Morgan, 2015). Over the past decade research has focused on identifying solutions, such as “eco-friendly substitutes” for chemicals used in production (Choudhury, 2014, p. 25), cleaner wastewater treatment methods (Periyasamy, Ramamoorthy,

Rwawiire, & Zhao, 2018), and Slow Fashion—a holistic approach to apparel and seeks to curb both production and consumption (Fletcher, 2010). As consumer interest in sustainability continues to grow, more brands and retailers are incorporating sustainability goals into business practices each year (Lehmann, et al., 2018). Unfortunately, many of these retailers' goals do not address the larger industry-wide problems of overproduction and overconsumption.

Overproduction occurs because the current MP model is based on an approximation of sales (Fralix, 2001) and sales growth, which results in an ever-increasing amount of goods being produced, even if there is no consumer to buy them (Allwood, 2018; Boër, et al., 2018). In the textile industry, overproduction is estimated at 40% (Boër et al., 2018), that is, for every 100 products made, 40 will never be sold. Overproduction is a side-effect of MP, but MC offers a solution to this problem because the made-to-order nature that implies products are not made until they are requested and sold to consumers (Boër, Pedrazzoli, Bettoni, & Sorlini, (2013). This shift towards consumer-driven production has the potential to eliminate the production of deadstock, offering an ecologically sustainable alternative to MP (Boër et al., 2013). However, research linking MC to ecological sustainability is still limited (Gembariski et al., 2018) and has focused mainly on operations management and product design (Kohtala, 2015). Certainly, reducing production through a made-to-order approach would reduce waste and energy use across the supply chain; however, the consumer side of the apparel life-cycle must be addressed for apparel to become sustainable in the long-term (Kunz et al., 2016).

Overconsumption (or hyperconsumerism) has been used to describe the American culture and is conceptualized as the “use of goods and services that are in great excess of basic needs” (Grauerholz & Bubriski-McKenzie, 2012, p. 333). Although the term overconsumption has not yet been clearly defined in a clothing and textile context, it is generally understood as having

harmful environmental consequences (Sheth, Sethia, & Srinivas, 2011) and resulting in excess textile waste (Pookulangara & Shephard, 2013) as consumers dispose of more clothes to make room for the new (Lang, Armstrong, & Brannon, 2013). The average American consumer throws away around 81 pounds of clothes each year (Gilmore, 2018). Overconsumption includes aspects of consumer behavior such as compulsive buying, hoarding, and high rates of purchase and disposal. These behaviors have been linked to materialistic consumer values (Joung, 2013) and the disposable consumer mindset that is commonly linked to the fast fashion concept (Bhardwaj & Fairhurst, 2010; Gabrielli, Baghi, & Codeluppi, 2013). Lang et al. (2013) found high rates of apparel disposal in young, fashion conscious consumers who shop frequently. These shopping characteristics describe many fast fashion consumers, and previous research found that Italian fast fashion consumers were not only aware of the poor quality of products but considered it to be a benefit because of the low cost and low risk involved in trying new trends (Gabrielli et al., 2013). According to the authors “fast fashion has changed consumers’ shopping habits...prompt[ing] the temptation to purchase several more items” (Gabrielli et al., 2013, p. 213).

The fast fashion model relies on computer and internet technologies to implement quick-response and enhanced design strategies (Cachon & Swinney, 2011) that shorten production times and deliver trend-forward styles (Crofton & Dopico, 2007). Due, in part, to technological advances and changing consumer behaviors and expectations, the shift toward quick production and trendy designs has moved beyond fast fashion and into apparel production generally; resulting in the disposability crisis that currently plagues the apparel industry at-large (Claudio, 2007). Previous research has shown that fast fashion consumers buy more clothing, more frequently (Gwozdz et al., 2017; Lang et al., 2013) and therefore, ultimately, have more items

needing to be divested (Weber, Lynes, & Young, 2017). The innovations in apparel production technologies that enabled the growth of fast fashion also enable the development of lean manufacturing practices, a key component of mass customization.

Innovations in apparel production technology. Textiles have been a source for human and global innovation throughout history. Our homo sapiens predecessors, the Denisovans are the oldest known source of hand-needles, dating back 60,000 years (The Siberian Times Reporter, 2016), and the textile and apparel industry are woven into the industrial revolution that paved the way to our current global consumer market (Zakim, 2003). Today, innovations in the textile and apparel industry are seen in the industry's reliance on computer and internet technologies that make design and production processes more efficient. Computer-aided design (CAD) programs like Optitex and CLO offer fully digital apparel prototyping, including 3D renderings with simulated fabric properties allowing the design and fit process to happen virtually; this saves time between sample iterations and eliminates the waste associated with producing physical early prototypes (e.g., materials, transportation, labor) (Optitex, n.d.). Computer-aided manufacturing (CAM) systems like automatic fabric spreaders and cutters (Gerber Technology, 2016) and seamless knitting machines that produce fully assembled garments from a machine that resembles a large plotter printer (Buecher et al., 2018) make flexible and lean manufacturing possible. Advances in CAD and CAM technology have enabled the growth mass customization (Da Silveira, Borenstein, & Fogliatto, 2001; Kohtala, 2015; Lee, Damhorst, Campbell, Loker, & Parsons, 2011; Nayak, Padhye, Wang, Chatterjee & Gupta, 2015; Yang et al., 2015).

Today, integrated CAD and CAM systems enable MC production at Brooks Brothers (Gerber Technology, n.d.) - the retail brand that invented ready-made apparel two centuries ago

(Zakim, 2003). Adoption of the MC paradigm in the apparel industry appears to be at a crucial stage; Adidas recently piloted a custom garment “printer” at a brick-and-mortar location (Buecher et al., 2018), suggesting that the next stage of MCA development could include 3D body scanning technology in-store. 3D body scanning technology (Fralix, 2001) is an innovation that continues to hint at a future where consumers and retailers can access body scan and personal preference data across customization platforms via a digital keychain (Anderson-Connell, Ulrich, & Brannon, 2002; Nayak et al, 2015). A study of Korean consumers found generally positive attitudes towards 3D body scan technology, especially for the purpose of customizing apparel products (Park, Nam, Choi, Lee, & Lee, 2009). These findings suggest that as these technologies continue to improve and new technologies are introduced, the customization process will become easier to incorporate into existing product lines, and as previously mentioned offers the additional implied ecological benefit (compared to the MP model) of eliminating overproduction (Boër et al., 2018).

Mass Customization (MC) & Mass Customized Apparel (MCA)

When the concept of MC was first introduced by Stan Davis in 1987, he defined it rather simply as “the production and distribution of customized goods and services on a mass basis” (Davis, 1996, p. 15). Pine et al. (1993) understood MC as requiring a “highly skilled, flexible work force to make varied and often individually customized products at the low cost of standardized, mass-produced goods” (p. 108), and today, MC is understood as high volume and low-cost production of customized products (e.g., Da Silveira et al., 2001; Park & Yoo, 2018; Trentin et al., 2014). Mass customization is an ideal way for retailers and service providers to meet consumers expectations for personalized service and diverse (unique) product offerings (Fralix, 2001).

Extant literature has explored consumer attitudes towards MC products and customization programs, with early studies indicating MC product value is created both through the product itself and the resulting unique, functional, and/or self-expressive benefit (Hunt, Radford, & Evans, 2013; Merle et al., 2010; Park & Yoo, 2018; Wan et al., 2017), or from the co-design experience (Merle et al., 2010)—what has been conceptualized as the process benefit (Park & Yoo, 2018; Wan et al., 2017). Park and Yoo (2018) found that both process and product benefits had a positive effect on consumer attitudes towards a MC program, as well as emotional product attachment.

Trentin et al., (2014) found the customization platform itself could influence the consumer's hedonic and creative achievement benefit depending on the website capabilities (e.g., user-friendly product space, focused navigation) suggesting that consumer attitudes toward MC products vary between product categories and between different website platforms (also referred to as interfaces and configurators). In 2017, Grosso, Forza and Trentin examined how social software (e.g., instant messaging, social network sharing, personal media uploads) used by mass customization retailers either on their websites generally, or within the specific product configurators, are and can be used to aid the consumer decision-making process. The authors found that social software tools that enabled real-time feedback from peers, experts, and/or other reference groups positively influenced the consumers purchase intentions toward the MC products (Grosso et al, 2017).

More recently, MC configurators were the focus of a cross-cultural study that compared the information processing styles of eastern (holistic) and western (analytic) consumers (de Bellis, Hildebrand, Ito, Hermann, & Schmitt, 2019). The authors noted that a majority of MC configurators currently cater to a more analytic information processing style and use what is

called a “by-attribute interface” that follows a “bottom-up assembly” whereby consumers “choose each product attribute individually”; the less commonly used “by-alternative interfaces” present “a set of fully assembled alternatives” from which consumers make a selection—this interface aligns with the holistic information processing style (de Bellis et al, 2019, p.1051). The authors hypothesized and confirmed through empirical experiments that by presenting a culturally congruent interfaces to consumers MC retailers can positively influence purchase intentions, product satisfaction, and the amount of money consumers are willing to spend (de Bellis et al., 2019). For further details of previous MC consumer literature refer to *Table 2*.

Table 2. Non-Apparel MC Key Literature

Source	Sample	Product Categories	Key Variables
Merle et al. (2010)	University Students (1: n = 228; 2: n = 546)	Footwear (NikeID)	<ul style="list-style-type: none"> • MC Product Value <ul style="list-style-type: none"> • Utilitarian, uniqueness, & self-expressiveness • Co-Design process value • Hedonic & creative achievement
Lee & Chang (2011)	University Students (n= 749, South Korea)	Footwear	<ul style="list-style-type: none"> • TAM + p. enjoyment & p. control • Fashion Involvement & Web Skill • Attitude toward online mass customization <ul style="list-style-type: none"> • Willingness to purchase • Willingness to recommend
Hunt et al. (2013)	University Students (n = 239, Midwest, USA)	Alarm clocks, book bags, cell phones, & desk chairs	<ul style="list-style-type: none"> • Consumer need for uniqueness • Involvement in functional & symbolic benefits • Perceived risk of customized product <ul style="list-style-type: none"> • Perceived value of customized product
Trentin et al. (2014)	University Students (n = 75)	Laptops, Sneakers, Economy Cars	<ul style="list-style-type: none"> • Creative achievement • Hedonic benefit of MCA experience • Sales configurator capabilities <ul style="list-style-type: none"> • focused & flexible navigation • user-friendly product space description
Grosso et al (2017)	277 Online Sales Configurators ^a	Many Industries Represented	<ul style="list-style-type: none"> • Interested in the social dimensions enabled or not by MC through the online sales configurator and how they impact the decision-making process. • Modalities afforded by social network include individuality, expert advice, and community support

Table Notes. ^a. The authors used a configurator database that classifies MC configurators by country, industry, and product. The sample included 43 apparel configurators, 35 accessory and 10 footwear configurators, other industries also represented in the sample such as, automobiles, food, pets, and entertainment.

Table 3, cont'd. Non-Apparel MC Key Literature

Source	Sample	Product Categories	Key Variables
Wan et al. (2017)	University Students (n = 321, China)	Nike Sneakers	<ul style="list-style-type: none"> • Perceived value of online customization experience <ul style="list-style-type: none"> • Results (Functional, Self-realization, Uniqueness, Symbolic) • Process (Hedonic, Self-realization, Knowledge, Sensory) • WTP & Purchase intention
Park & Yoo (2018)	Online Female Shoppers (n=290, South Korea)	Watches	<ul style="list-style-type: none"> • Process and product benefits • Emotional product attachment • Attitudes towards MC program • Loyalty intention • Product involvement & Fashion innovativeness
de Bellis et al (2019)	Five experiments comparing consumers from “Eastern” and “Western” markets ^b	Cars, Chocolates, & Headphones	<ul style="list-style-type: none"> • Culture (information processing style) • Mass customization interface type • Conversion rate, product satisfaction, purchase intention, and money spent

Table Notes. **Bold** = non-student population.

^b. Pilot tested with approx. 32,000 custom car purchase orders from 3-year period. Experiments 1 & 2 had under 200 participants using Singapore and Germany to represent “east” and “west.” Experiment 3 used 412 MTurk workers from India and the United States. Experiments 4 & 5 were real-world field studies using 133 “visitors” of a chocolate shop, and approx. 206,000 Facebook users, respectively, representing both eastern and western markets.

According to Lee and Moon (2015), MCA “is the process by which consumers partner with a company to produce an apparel product as they want it” (p.115). This consumer-centric production model enables retailers to better address consumer needs and achieve higher levels of customer satisfaction through modular customization options (Yang et al., 2015) that are selected by individual retailers. Previous studies have used stimuli such as jeans (Cho & Wang, 2010; Lee & Moon, 2015), t-shirts (Franke, Schreier, & Kaiser, 2010; Kamali & Loker, 2002; Schreier, 2006), scarves (Franke & Schreier, 2010; Franke et al., 2010; Schreier, 2006), business wear (Kang & Kim, 2012), and leisure clothing (Michel et al., 2009) to investigate consumer motivations, perceptions, and intentions toward buying MC products; however, previous research has left gaps in what is known about MCA consumers and their behaviors. Extant literature has focused on measuring attitudes and intentions of potential MCA consumers, using variables such as willingness-to-pay (WTP) and willingness-to-wait as measures of purchase

intention (see for example, Franke & Schreier, 2010; Hawa, 2018; and Michel et al., 2009).

These studies have found the co-design process inherent in the online mass customization experience is linked to many of the benefits and risks that influence consumer motivations and purchase intentions.

Weighing benefits and risks is part of any consumer decision process; however, the self-expressive nature of MC products offers both benefits and risks simultaneously. A unique product may be desired by some (Merle et al., 2010), but it could imply greater social and psychological risks to others (Lee & Moon, 2015). Through customization, consumers may achieve a better preference of fit (Franke & Schreier, 2010), but also risk the additional efforts required to customize a product and the uncertainty over when and what will be delivered (Lee & Moon, 2015). The creative achievement benefit (Trentin et al., 2014; Wan et al., 2017), which has also been described as pride of authorship (Schreier, 2006) and the “I designed it myself effect” (Franke et al., 2010, p. 1), is believed to motivate MCA purchase intentions and has previously shown a positive influence on emotional product attachment (Park & Yoo, 2018). However, this positive influence depends on the consumer’s ability to achieve what is desired, because “unsuccessful effort is interpreted as (negative) drudgery” (Franke & Schreier, 2010, p. 1028).

In a study of Swedish custom knit-wear consumers, Larsson (2012) found the consumers were “mostly ordinary...but with some extraordinary needs” (p. 187), and they tended to be fashion followers who were most concerned with the fit, aesthetic, and quality of clothing. This is the only known study of customized apparel consumers, but it is limited by its small sample size (quantitative data from 38 purchase orders, and 8 qualitative interviews) and focus on consumers’ chosen customizations, without consideration of motivations or sustainability.

Nonetheless, these findings support previous findings that reported overcoming negative attributes of standardized products had the strongest effect on consumers' willingness-to-pay for customized products (Michel et al., 2009). See *Table 3* for an outline of reviewed MCA literature.

Table 4 Key MCA Literature

Source	Sample	Product Categories	Key Variables
Kamali & Loker (2002)	University Students (n = 72, Female, NY, USA)	T-shirt	<ul style="list-style-type: none"> • Purchase intention • Satisfaction with the customization process • Satisfaction with the website interface
Ulrich et al. (2003)	University Students (n = 34, female)	Three-piece career outfit	<ul style="list-style-type: none"> • Comfort with co-design process • Satisfaction with product image • Ease of making design • Clothing Innovativeness & Clothing Involvement
Fiore et al. (2004)	University Students (n = 521, Midwest USA)	Apparel generally (co-design process)	<ul style="list-style-type: none"> • Motivations for MCA: <ul style="list-style-type: none"> • exciting product • unique product • Willingness to use Co-design
Schreier (2006)	University Students (n = 185, Vienna)	T-Shirt, Scarf, Cell Phone cover	<ul style="list-style-type: none"> • WTP (compared to MP) • MC Product Benefits • functional, perceived uniqueness, 'do-it-yourself' effect, pride of authorship
Michel et al. (2009)	“Head of household” (n=571, Swiss-German, 57% +50)	Leisure Clothing (Levi's, Nike)	<ul style="list-style-type: none"> • Motivations to Purchase MC Products • Need for uniqueness • Perceived product category risk and involvement
Franke & Schreier (2010)	University Students (n = 186, Europe)	Scarves	<ul style="list-style-type: none"> • Perceived preference of fit <ul style="list-style-type: none"> • Perceived process effort • Perceived process enjoyment • Value (measured as WTP)
Franke et al. (2010)	University Students (1: n = 37; 2: n = 114)	T-shirts, Scarves, Cell phone covers	<ul style="list-style-type: none"> • Product interest • Purchase intention • WTP • MCA product & process benefits
Cho & Wang (2010)	University Students (n = 300 USA, n = 303 Taiwan, female)	Jeans (simulation)	<ul style="list-style-type: none"> • Perception of customization website • Attitude toward online customization • Cultural differences
Lee et al. (2011)	Parents of Children (n = 208, USA)	Children's Apparel	<ul style="list-style-type: none"> • Perceived performance, disconfirmation of expectations, satisfaction with MC process, behavioral consequences, demographics • Moderating effect of interactivity of MC sites • Satisfaction primarily driven site performance; predicted by disconfirmation

Table Note: **Bold** = non-student populations

Table 5, cont'd. Key MCA Literature

Source	Sample	Product Categories	Key Variables
Kang & Kim (2012)	University Students (n = 301, Southeast USA)	Business Wear (mock site)	<ul style="list-style-type: none"> • Desire for unique consumer product • Perceived risk • Purchase intentions • TPB: attitude toward MC, SN, PBC
Larsson (2012)	Swedish Custom Clothing Consumers (n = 37 purchase order (quantitative), n = 8 interviews (qualitative))	Knitwear (tops)	<ul style="list-style-type: none"> • How customers choose to customize • Fashion Involvement (innovator, Follower, or Adopter) • Mass customization process (configuration)
Lee & Moon (2015)	University Students (n = 400, Korean, Female)	Jeans (example)	<ul style="list-style-type: none"> • Perceived risks of MCA <ul style="list-style-type: none"> • financial, product performance, psychological, social, delivery, additional effort, and returns
Hawa (2018)	Apparel Consumers (n = 13 Ottawa, CA)	Apparel generally	<ul style="list-style-type: none"> • Attitudes toward MCA • Purchase intention • Willingness to pay WTP (extra) • Willingness to wait
Seo & Lang (2018)	University Students (n = 338, Southeast USA)	Customized Apparel Products Generally (purchase intention)	<ul style="list-style-type: none"> • Internal-oriented psychological factors (self-promotion, need for uniqueness, self-expression and self-monitoring) • External-oriented psychological factors (social identity, other-directedness) • Perception of Customization and the sense of extended-self → purchase intention.
Seo & Lang (2019)	University Students (n = 338, Southeast USA)	ibid	<ul style="list-style-type: none"> • Influence of psychogenic needs (uniqueness, self-promotion, social identity) on perceptions of MCA and purchase intentions <ul style="list-style-type: none"> • Moderating effect of gender

Table Note: **Bold** = non-student populations

MCA Specific Consumer Characteristics

The first objective of this thesis is to understand current MCA consumers in regard to their MCA specific characteristics, including *motivations for MCA purchase* and *satisfaction with MCA product and customization experience*. These descriptor variables are included in the segmentation framework to explore the MCA consumer experience and may provide useful insight for marketers and product designers. Previous research in MC and MCA provide background understanding for these concepts, and relevant findings will be discussed in the following sections.

Motivations for MCA purchase. Motivations are the reason or reasons for behaving in a certain way, such as factors that influence consumer purchase behaviors (Westbrook & Black, 1985). In an MCA context, these factors are related to product and process benefits (Merle et al., 2010). MCA offers the consumer the ability to create a one-of-a-kind, self-representative product to better suit their individual aesthetic and functional preferences (e.g., Franke & Schreier, 2010; Larsson, 2012). These benefits are considered motivators of MCA purchase intentions (Fiore et al., 2004; Michel et al., 2009). Empirical examinations have shown positive influences of MC product benefits like uniqueness (e.g., Hunt et al., 2013; Kang & Kim, 2012; Michel et al., 2009) and self-expression (Merle et al., 2010; Seo & Lang, 2018; Wan et al., 2017) in motivating purchase intentions. These benefits are made possible through the co-design process that is included in the online customization experience. Fiore et al. (2004) found both the unique product and exciting experience influenced students' willingness to use co-design for online apparel customization. The MC experience enables input from the consumer to modify a product by selecting various customization options as predetermined by the producer (Yang et al., 2015). Although this is not truly a co-design experience, it nonetheless enables the consumer to experience a do-it-yourself effect (Schreier, 2006) that can also be understood as a feeling of creative achievement (Franke et al., 2010; Merle et al., 2010; Trentin et al., 2014) and a pride in oneself (Schreier, 2006) that result from helping to design your own product. This hedonic value (Yu & Park, 2014; Wan et al., 2017) and process enjoyment (Franke & Schreier, 2010) have been shown to influence consumer purchase intentions towards MC products and lead to higher product evaluations in enjoyable customization experiences (Franke et al., 2010). It is through the process of product customization that consumers can create a product that better suits their individual needs, thus providing a functional or utilitarian benefit to the consumer, and possibly

motivating repeated MCA purchases. These benefits of MCA have been shown to influence purchase intentions and willingness-to-pay (WTP), but no study has examined motivations of actual MCA consumers. Trentin et al. (2014) found user-friendly and easy to navigate online customization platforms were linked to higher perceived creative achievement and hedonic benefits. Taken together, research suggests that while the *notion of the co-design* process may motivate the MCA purchase *intention*, the experience of customizing the product *using the online customization platform* may influence the purchase *decision* and overall product satisfaction.

Satisfaction with the MCA product and customization experience. Consumer satisfaction results from the expectations conceived as cognitive functions prior to purchase and is impacted directly and indirectly by attributes of product performance as well as attributes associated with the consumption experience (Oliver, 1993). Satisfaction influences the strength of consumer motivations (Westbrook & Black, 1985). How often someone shops or replaces a product “depends on their experiences with and feelings toward their old product” (Mugge, Schifferstein, & Schoormans, 2010, p. 271). Satisfaction with the product and customization experience in an online apparel shopping context is what leads to repeat purchases, brand loyalty, and word-of-mouth behavior (Lee et al., 2011). Mugge et al. (2010) studied utility and appearance as determinants of product satisfaction and found that product utility had a significant and positive effect on product satisfaction and emotional product attachment. MCA consumer segments may have different utilitarian needs which motivate their customization purchases (e.g., atypical body shape), while experience adding functional customizations like pockets, work-appropriate neck and hemlines, or weather-appropriate sleeve lengths and fabric

weights may provide utilitarian satisfaction that leads to long-term customization purchase behaviors.

Additional previous literature has suggested the satisfaction with the MCA experience is influenced by the consumer's ability to effectively operate the customization platform (de Bellis et al., 2019; Trentin et al., 2014) and the degree to which they are able to achieve the desired product outcome (Kamali & Loker, 2002; Lee et al., 2011). For instance, if a specific customization feature desired by the consumer is unavailable, they may feel dissatisfied with the customization process, which could lead to dissatisfaction with that retailer or customization generally and limit future purchase behaviors. On the other hand, if a consumer has a fun experience customizing a garment that they feel represents their personality, they are likely to be satisfied with the product image (Ulrich et al., 2003), are more likely to purchase (Seo & Lang, 2018), and may become loyal consumers (Park & Yoo, 2018) and possibly brand and customization advocates.

Satisfaction as a variable related to MCA has mainly been studied as satisfaction with the customization platform or process (Kamali & Loker, 2002; Lee et al., 2011) or satisfaction with the product image (Ulrich et al., 2003) using non-MCA consumers. Little previous research has included existing customers of customized apparel as sample population. In a student population Kamali and Loker (2002) found satisfaction with the customization process was significantly and positively related to the degree of customization participants were exposed to in treatment groups simulating the customization process of a t-shirt. Another student population asked about satisfaction with the product image of a customized business suit created on a mock website; 33 of 34 were satisfied with the product image they had created, and 22 of those indicated they were willing to purchase the product they had designed (Ulrich et al., 2003). Similarly, in an adult

consumer population, Lee et al. (2011) created a mock children's wear customization platform and found that the level of interactivity available (e.g., more customization options) positively influenced performance evaluations of the site, leading to more positive satisfaction with the customization experience in turn positively affecting purchase intention and intention to return or recommend the customization platform. Other MC and MCA research has examined satisfaction as an attitude, relating to perceived value (e.g., willingness to pay, willingness to wait, willingness to recommend) and purchase intention (e.g., de Bellis et al., 2019; Hawa, 2018; Lee & Chang, 2011; Wan et al., 2017). The only known explicit sampling of custom apparel consumers found long-term satisfaction was related to the quality, fit, and aesthetic of the garment, with the price and time of delivery having little long-term impact on satisfaction (Larsson, 2012). Although it was a small-scale, these findings suggest previous MCA researchers who have focused on willingness-to-pay and willingness-to-wait are missing a key element of the MCA product relationship; therefore, this thesis will expand the literature by sampling existing MCA consumers to learn more about their satisfaction with the actual purchased MCA products and their customization experiences.

Mass Customized Apparel (MCA) From A Sustainability Perspective

From a sustainability perspective, mass customization as a production method for apparel has the potential to “sharply reduce overall production, waste creation, and resource consumption” (Lehmann, et al., 2018, p. 95) by eliminating the need for overproduction, as well as the associated consumption of natural resources and energy that accompany the production of deadstock (Boër et al., 2018). Nayak et al. (2015) compared the low inventories, better employee relationships, and a “sense of community” of the mass customization production model to the current mass production model which relies on high inventories, a “lack of investment in work

skills” and “poor management—employee relations” (p.165). Additionally, the authors posited that body measurement technologies (e.g., 3D body scanners) as applied to mass customization have the potential to reduce the number of clothing returns; however, they recognized that many of these newer technologies are still being refined and improved (Nayak et al, 2015). These advantages of the MCA model offer potential ecological and social benefits. Seo and Lang (2018) suggest that customization may lead to prolonged product lifespan through emotional product attachment (e.g., the customized product is perceived as an extension of the self), but the authors did not empirically test this assumption—their main interests were perceptions of MCA and purchase intentions.

The made-to-order concept at the core of MCA is not innovative. Historically, garments were custom-made or made-to-order until innovations of the late 18th and early 19th centuries enabled the development of ready-made (mass-produced) apparel (Zakim, 2003). Over the past two centuries, customization declined as ready-made apparel gained prominence (Boër et al., 2018) and today the convenience of mass-produced fast fashion products results in damaging effects to our environment (Cobbing, 2018). Transitioning apparel production back towards the custom paradigm affords the potential to improve retailers’ sustainability relating to all three measures of sustainability: financial, social, and ecological (Buecher et al., 2018). However, the potential of MCA production to have sustainable benefits also depends on consumers behaving more sustainably. Unfortunately, no MCA consumer studies to date have considered an environmental sustainability perspective so there is no existing information relating MCA purchase patterns with sustainability variables such as environmental attitudes or sustainable consumer behaviors. In fact, given the limiting nature of the samples studied in previous MC and MCA research, it is unknown whether and to what extent MCA consumers may display

sustainability variables. Thus, the second question guiding the present research was to what extent MCA consumer segments may display sustainability-related characteristics (i.e., *emotional product attachment* and *environmental attitudes*) and behaviors and how might these variables influence their MCA purchase patterns and characteristics.

Although, research in online retailing and customization has been present in the literature since the 1990s (Hankammer et al., 2020) to date there is still limited research examining MC from an ecological sustainability perspective. Additionally, interdisciplinary customization researchers have been hindered by a lack of defined and consistent terminology across fields of study, though it should be noted that Hankammer et al. (2020) found that within an apparel and footwear context, there seems to be a defined terminology utilized by researchers in the field. This lack of interdisciplinary agreement has surely limited the growth of topics such as sustainability within the (mass) customization literature. Kohtala (2015) conducted an integrated literature review on research addressing environmental sustainability within the realm of “distributed production,” which the author noted included “customization and personalization [as well as] co-production or personal fabrication of goods” (p.654-655), stating further that this research topic specifically lacks a common understanding or terminology. The author found only three conference proceedings dealing with the sustainability of MC, focusing specifically on evaluating MC production to MP with specific considerations given to lifecycle assessment, and energy and water usage comparisons (Kohtala, 2015). There is a clear interest in the overlap of MC production and environmentally sustainable production, but there is a gap in the literature, especially within the apparel context; this research seeks to begin filling this gap and expand and further clarify this topic of interest.

Sustainability-Related Variables

Taking the sustainability perspective into consideration, and with regard to the apparel product context, sustainability specific descriptors included in the segmentation framework of this thesis include *emotional product attachment*, *environmental attitudes*, and behavioral indicators related to apparel specific and general consumer behaviors. These variables will help to describe the MCA consumers in relation to sustainability and build a foundation for future sustainable apparel researchers interested in MCA. The following sections will review literature relevant to the sustainability specific descriptors.

Emotional product attachment. *Emotional product attachment* refers to the connection that is formed between an individual and an object (Park & Yoo, 2018) and has sometimes been conceptualized as psychological ownership of an object (Baxter et al., 2015). Superior product utility was shown to have a significant positive influence on emotional product attachment (Mugge et al., 2010), while psychological ownership has been found to increase a product's price evaluation (Franke et al., 2010). Niinimäki and Hassi (2011) state that consumers who perceive products as more valuable will view them as less disposable, suggesting that increasing *emotional product attachment* may lead to more sustainable consumer behaviors like extended product longevity and reduced consumption (as they have less need to replace products). *Emotional product attachment* may also stem from the feeling that the customized product is an extension of oneself (Seo & Lang, 2018), or the uniqueness of the customized product.

Mugge et al. (2009) found that the effort involved in personalizing a bicycle and the emotional bond created between the user and product were directly correlated. This finding is echoed by literature that has shown increased process effort in the MC experience results in higher willingness-to-pay (Franke & Schreier, 2010), suggesting the co-design process and

creative achievement value afforded through a MCA purchase will lead to increased emotional product attachment. Additionally, consumers are believed to consume and dispose of products more sustainably when they have an emotional attachment to the object (Cho et al., 2015) by reducing the need to replace the existing object and perhaps encouraging maintenance behaviors. Increasing sustainable use and maintenance behaviors through *emotional product attachment* may help to transition consumers towards a circular economy, whereby they re-use or recycle (or downcycle or upcycle) their MCA products out of a desire to avoid throwing away a product which the consumer feels a strong emotional attachment.

However, “our commonly held assumption that product attachment can have a positive effect on consumption patterns” (Kohtala, 2015, p. 660) has not been empirically tested. Although no empirical evidence has validated this assumption, early findings suggest that higher *emotional product attachment* may be linked to less frequent and lower quantity consumption (Cho et al., 2015), as well as longer relationships with MCA products and retailers (Park & Yoo, 2018). Therefore, this thesis considers *emotional product attachment* to be a significant variable of interest to the sustainability of MCA from a consumer perspective.

Environmental attitudes. Environmental attitudes refer to an individual’s environmental concerns and the degree to which they view human activity as a cause of environmental degradation (Dunlap et al., 2000) and have been conceptualized as two dimensional, that is pertaining to the individual and societal role in the degradation of the environment (Trivedi, Patel, & Acharya, 2018). Previous empirical research has shown that positive environmental attitudes are negatively related to materialistic values (Joung, 2013; Kilbourne & Pickett, 2008) and positively related to sustainable fashion consumption (Razzaq et al., 2018). Extant literature has found positive environmental attitudes have significant effects on consumers’ purchase

intentions towards sustainable products. Trivedi et al. (2018) found that environmental attitudes related to individual consumers' actions (as opposed to broader social or political action) had a positive influence in purchase intentions toward eco-friendly products generally, and Koszewska (2016) found pro-ecological and pro-social attitudes were both determinants of purchase intentions toward sustainable apparel products more specifically. Kang, Liu, and Kim (2013) found pro-environmental attitudes have a significant positive effect on purchase intentions toward environmentally sustainable apparel and textiles, suggesting that environmental attitudes may also influence purchase behavior towards sustainable products, but it is unclear whether or how environmental attitudes may relate to MCA purchase patterns given that most MCA retailers do not address the environmental benefits of the customization model. However, findings from a recent study of Indian consumers highlight the benefit of segmentation analysis within sustainable consumer research. Sharma and Jha (2017) grouped consumers according to their sustainable consumer behaviors and found that environmental attitudes had a direct and indirect influence on sustainable consumer behaviors, but that the strength of the relationship varied depending on individual values and how impactful they believe their behaviors will be.

Sustainable consumer behaviors. Sustainable consumer behaviors include those behaviors related to the purchase, use, maintenance, and disposal phases of the product life-cycle that minimize environmental impact (Kunz et al., 2016). These behaviors can include actions as simple as turning off lights and unplugging appliances when not in use, recycling paper, plastic, glass, and aluminum products and packaging, air drying clothes and hair, taking public transportation, and donating things you no longer use (United Nations, n.d.). Examining sustainable consumer behaviors among MCA consumers will provide further understanding of the potential connection of MCA consumption and sustainability.

Sustainable apparel behaviors. Sustainable apparel behaviors may happen in the pre- or post-purchase phase of consumption and have been conceptualized as “a variety of behaviors that consumers engage in to minimize their environmental and social impact” (Diddi, Yan, Bloodhart, Bajtelsmit, McShane, 2019, p.200). An easy to remember mantra for sustainable apparel consumption—buy less, choose well, make it last—originated as a plea to consumers from the London-based fashion designer, Vivienne Westwood (New Agencies, 2013). Unfortunately, in the United States today, the consumer market is positioned to appeal directly to the unsustainable and vexing trends of overconsumption and convenience (i.e., disposable) (Cobbing, 2018), with fast fashion driving much of the apparel industry’s unsustainable behaviors (Kunz et al., 2016). Sustainable apparel behaviors include limiting purchases—especially of new or “virgin” apparel and materials; repairing or altering garments for longer use; laundering with lower water temperatures and hanging clothes to dry; and donating, upcycling, or recycling garments (Kunz et al., 2016). Extant literature has looked at sustainable fashion consumption (Razzaq et al., 2018), environmentally friendly consumption (Gwozdz et al., 2017), environmental apparel purchases and sustainable apparel divestment (Cho et al., 2015) in trying to determine what consumer characteristics and other factors may drive sustainable consumption behaviors. For instance, Cho et al. (2015) used the term ‘style consumption (SC)’ to address sustainable apparel behaviors, and conceptualized SC as relating to “an individual style whose design one perceives [as] classic and at the same time speaks about oneself” (p.661). Results indicated that style consumption was positively related to both environmental apparel purchase and sustainable apparel divestment; style consumption is also believed to promote product longevity and durability (Cho et al., 2015). The environmental impact of individual garments depends on the full product life-span, and extant literature has found that consumers are likely to

dispose of clothing when they show signs of wear and tear or are no longer in fashion (Laitala, 2014). When considering the low-quality fast fashion products, this leads to high disposability (Joung, 2014) and more frequent consumption of fast fashion products (Gabrielli et al., 2013). Frequent consumption of high amounts of apparel, regardless of whether they are sustainably made, is not a sustainable consumer behavior as it crosses into the realm of overconsumption (Koszevska, 2016) and ultimately leads to more waste than low frequency consumers (Weber et al., 2017). Previous studies in product personalization and customization have suggested that higher emotional product attachment may lead to increased product longevity (Cho et al., 2015). It has been suggested that keeping a product one-year longer, reduces the environmental impact of production 20-30% (WRAP.org, 2015). Additionally, keeping items longer may indicate more sustainable use behaviors such as mending, or a reduced consumption need, which would further suggest alignment with sustainable behaviors generally. By including sustainable apparel consumer behaviors in the present research, we can look for links between these behaviors and other consumer characteristics.

General sustainable behaviors. In addition to apparel specific sustainable consumer behaviors, this study is interested in general sustainable consumer behaviors, which include behaviors such as recycling, commuting via public transit, conserving household energy or water use (i.e. turning off lights when not in rooms, taking shorter showers), and choosing to purchase environmentally friendly consumer goods (United Nations, n.d.). Including these general sustainable behaviors in the study will allow for more holistic examination of MCA consumers' sustainable behaviors and possible links between demographic and other behavioral characteristics. Previous studies have looked at the causes or motivators of green purchase behavior (Trivedi et al, 2018), many in the context of how environmental knowledge and

attitudes lead to sustainable purchase behaviors or intentions (e.g., Brosdahl & Carpenter, 2010; Kumar, Manrai, & Manrai, 2017), but the researchers have not included other sustainable consumer behavior indicators, such as recycling or energy conservation, within their investigations. One study that did consider sustainable behaviors was conducted by Domina and Koch (2002), who examined the recycling habits of apparel consumers and found that access to, convenience of, and education about recycling influences more recycling behaviors, including materials such as textiles and apparel. Previous sustainable behavior research has considered consumer knowledge of environmental and social issues, and motivation for environmental responsibility as influencing sustainable consumer behaviors, but failed to collect actual behavioral data; instead relying on measures of behavioral intention (Saricam & Okur, 2019). As such, the inclusion of self-reported behavioral measures for generally sustainable consumer behaviors in our examination of MCA consumers will help to expand the literature on sustainable consumer behaviors by providing empirical data from the MCA consumer market.

Demographics

Previous MC consumer studies have not conducted much demographic analysis, probably due to the limiting demographic characteristics of the mostly student populations that have been investigated (e.g., Cho & Wang, 2010; Franke & Schreier, 2010; Hunt et al., 2013; Merle et al., 2010) leaving a gap in the knowledge about MCA consumer demographic characteristics. Hawa (2018) is one of the few researchers to look specifically at demographic variables (i.e., gender and BMI), but apart from this recent study, demographic information has been collected but rarely analyzed. Similarly, in sustainable consumer behavior research, the use of demographics has traditionally given researchers the information needed to verify (or not) the generalizability of the findings (e.g., Hyllegard, Yan, Ogle, & Lee, 2012; Trivedi et al., 2018) rather than as a

variable to be examined. Gender is the only demographic to receive attention by previous scholars relating to sustainable behaviors (e.g., Cho et al., 2015; Diddi & Niehm, 2016). In the broader apparel context, demographics like income and body type/BMI are believed to influence shopping behaviors through the physical limitations of budget or fit. Meanwhile, from a sustainable consumer behavior standpoint, income and education levels have linked to pro-eco and pro-social consumer behaviors (Saleem et al., 2018). Each demographic factor will be discussed separately in the following sections.

Income. In a study of US clothing consumers individuals with higher income “tended to purchase more clothing than those with less income”, and these individuals were also found to dispose of clothes more frequently as a result of the increased consumption (Lang et al., 2013, p. 710). Previous literature has shown consumers are willing to pay a price premium for sustainable consumer products (Chan & Wong, 2012), and higher income levels have been linked to more sustainable apparel purchase behaviors (Austgulen, 2016). Income has also previously been linked to more sustainable consumer behaviors, such as engaging in recycling programs (Domina & Koch, 2002). Previous MCA researchers have not considered this variable, but it seems clear that income should have an influence on a consumer’s willingness to purchase a customized apparel product, given that consumers willing to purchase customized apparel are willing to pay a premium price for it (Hawa, 2018). Prices for MCA products range from around \$20 for a custom printed t-shirt from Custom Ink or Zazzle (Custom Ink, n.d.a; Zazzle, n.d.), \$150 for a custom skirt from Rita & Phil (Rita & Phil, n.d.), to \$799 for a custom men’s tailored suit from Indochino (Indochino, n.d.). These prices are comparable to similar apparel products commonly available in the market, and income is likely to influence purchase frequency of MCA as it does apparel products generally. However, under the sustainability

perspective—and the concept of buying higher quality items less often—income data when viewed holistically with behavioral indicators may provide support for a sustainable mindset.

Education. Higher levels of education are believed to contribute to increased awareness of global issues such as the social and environmental aspects of sustainable development and consumption (Dunlap et al., 2000). Education levels are also believed to be related to income and psychographic factors such as technology self-efficacy. Findings from Li, Kuo and Russel (1999) indicate education was a predictor of online purchasing behaviors, suggesting it may also relate to MCA purchase patterns. However, although Kamali and Loker (2002) used the framework from Li et al.'s (1999) research to look at consumer adoption of MC, they controlled for the demographics of education and income because of the student population used. Given the high proportion of university student samples used in previous MC research, education has not been investigated as a consumer characteristic in previous literature. Hawa (2018) is the only MCA consumer-based study to incorporate education data in their personal questionnaires, but the author did not discuss possible correlations between education and MCA purchase intentions.

Body type/BMI. Body type is the general shape and size of the body and is sometimes measured using the body mass index (BMI). BMI is a measure used to calculate general healthiness (or fatness) of individuals using a ratio of height and weight measures (Center for Disease Control and Prevention, 2017). MCA motivates consumers with non-standard body shapes to receive garments that fit their body type and size, improving overall evaluations of product satisfaction and intended use period (Larsson, 2012). Differences in body type have been shown to be related to consumer's fit problems with ready-to-wear, shopping orientations (i.e. hedonic or utilitarian), and online shopping attitudes (Park et al., 2009). In qualitative interviews with Canadian consumers, Hawa (2018) used questionnaire data to determine BMI

and the individual's fit issues (relating to body type) to identify consumer segments of potential MC apparel consumers. Findings suggested that willingness to pay a price premium was moderated by BMI and body shape; participants with a low BMI and normal body types were unwilling to pay more for customized clothing, while participants with high BMI and/or untypical body shape were willing to pay 100-250% above regular retail pricing (Hawa, 2018). Although, body type has been discussed in previous MCA literature, no studies have sampled the existing MCA consumer market in the United States. The extent to which body type (as analyzed as BMI) may influence MCA purchase patterns or other consumer characteristics and behaviors is unknown.

In Summary

The proposed variables enabled the development of consumer profiles for existing MCA consumers. The consumer-oriented perspective provided by the findings of this research yield theoretical and market implications that can be used to strengthen and expand the existing MCA literature and marketplace. This thesis used a segmentation framework using MCA purchase patterns (i.e., *frequency of MCA purchase*, *amount of MCA purchase*, and *duration of MCA purchase behaviors*) because the existing MCA consumer market has yet to be empirically examined and previous consumer and retail research has suggested consumer buying patterns are useful in identifying other characteristics of the consumer market, such as their needs and preferences (Omar, 1999, as cited in Ratcliffe, 2017; Wind, 1978). Omar (as cited in Ratcliffe, 2017) considered buying patterns to be indicative of store loyalty; however, in the context of this thesis these variables will help to identify loyalty to MCA generally. *Frequency of MCA purchases* and *amount of MCA purchases* were considered to be useful for identifying consumers' predilection towards over-consumption (i.e., high frequency and high amount

consumers) or more responsible consumption (i.e., low frequency low amount consumer). *Duration of MCA purchase behavior* was included in the segmentation framework to elicit potential longitudinal relationships between MCA consumption behavior and the variables of interest (e.g., do long-term MCA consumers display increased *motivations for MCA purchases*, stronger *emotional product attachment*, or more *sustainable apparel behaviors*). Additionally, extant literature has suggested demographic variables, especially *income* and *body type* will have an influence on consumers MCA purchase patterns. The proposed segmentation framework based on MCA consumers' purchase patterns had a possible eight groupings using a high/low (short/long) distribution, see *Figure 1* for visualization of the possible groupings.

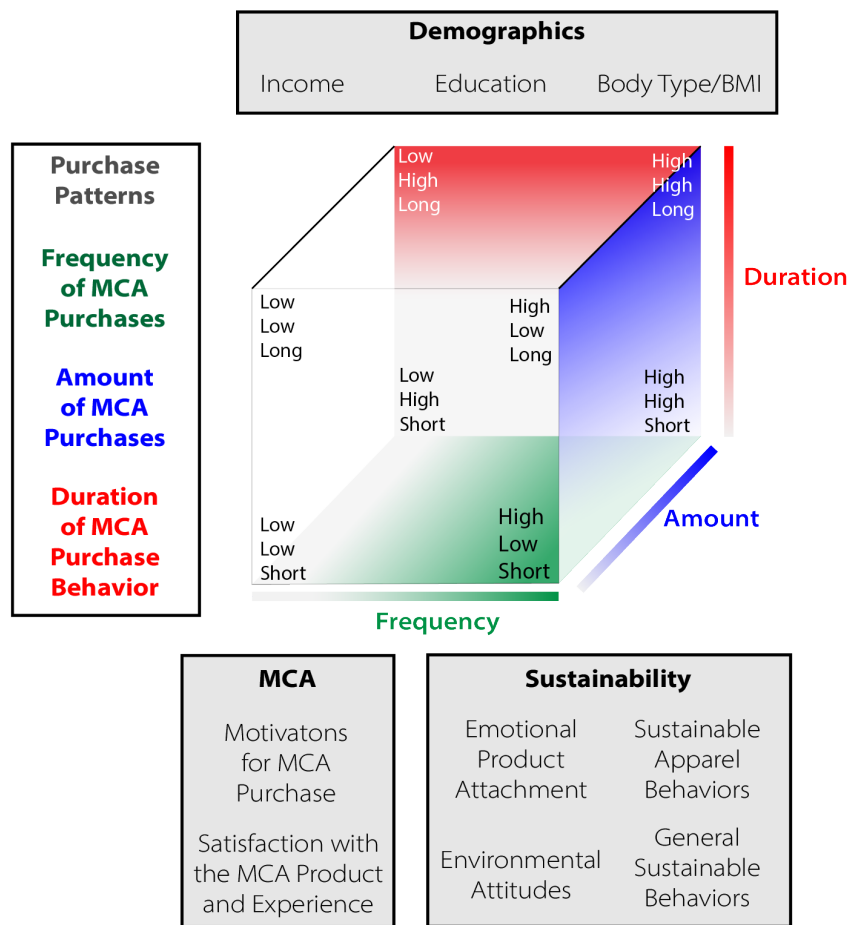


Figure 1. Segmentation Model Visualization

CHAPTER III - METHODS

This thesis aimed to identify the contemporary MCA consumers by examining their characteristics and behaviors related to MCA consumption. Market segmentation was proposed using purchasing patterns (i.e., frequency, amount, duration) to identify consumer groups. Previous literature has identified purchase patterns and behaviors as useful for for a general understanding of a market (Wind, 1978) and for identifying other key characteristics of a population (Omar, 1999, as cited in Ratcliffe, 2017). The identified segments were used in order to meet the dual purpose of this research: (1) to develop consumer profiles based on MCA-specific characteristics (i.e., *motivations for MCA purchase, satisfaction with the MCA product and customization experience*) and demographics (i.e., *income, education, body type/BMI*); and (2) to explore potential connections between MCA purchase patterns and variables that extant literature has suggested may influence sustainable attitudes (i.e., *emotional product attachment, environmental attitudes*) and behaviors (i.e., general and specific to apparel). To meet this purpose, an online consumer survey was conducted to gather data from current MCA purchasers in the United States.

Sampling Procedure

To conduct the proposed study, an online survey instrument was developed using the Qualtrics software that was distributed through the Amazon Mechanical Turk (MTurk) platform. A total of 506 participants were recruited using MTurk. Although the use of the online survey instrument could be seen as a limitation, with a potential bias toward age and technical online capabilities, the current research is interested specifically in MCA purchases made online. Therefore, it is assumed customers capable of customizing and purchasing clothes online are familiar enough with the online environment to complete an online survey.

Participants were recruited through MTurk where the requirements for participation and the survey cover letter was posted outlining the study and with a link to the Qualtrics survey. Several criteria were put in place for participant recruitment, including 1) participants had to be 18 years or older, 2) participants had to reside in the United States, and 3) participants must have made at least one MCA purchase in the two years prior. Gender was not an inclusion criterion as MCA products have been better known in a menswear context, so limiting this variable might have limited the size of the sample set. In selecting a timeframe limitation for inclusion, the two-year period was selected for two reasons. First, the customization of the product and subsequent possession of a unique product are expected to be more memorable than the typical retail purchase given the do-it-yourself effect (Schreier, 2006). Second, given the sustainability lens being utilized by the current study and the concept that sustainable consumption implies reduced consumption, it is possible that a sustainable apparel consumer purchases clothes at a rate of less than one garment per year, thus the longer timeframe for MCA purchase is considered appropriate. Participants were offered an incentive of \$1.35 for their participation in the survey and were notified that completing the survey was voluntary and anonymous. The rate for the incentive was established based on recommended pay schedule of \$0.10 per minute and an intended 10-minute survey completion time, and an additional \$0.35 with consideration of recruiting a more specialized participant (i.e., MCA consumer specifically and not just apparel consumers generally). Previous research has also suggested a higher incentive attracts more experienced, and higher quality MTurk workers (Casey, Chandler, Levine, Proctor, & Strolovitch, 2017).

MTurk workers and data quality. MTurk is an online crowd-source platform where “requesters” create a human intelligence task (HIT) for “workers” to complete for payment

(MTurk.com, n.d.) and has been used as a source of online panel data since the early 2000s. A meta-analysis of online panel sources generally found online panels to be as reliable as other convenience samples in the field of applied psychology when the convenience sample is similar to the population of research interest (Walter, Seibert, Goering, & O'Boyle Jr, 2019). Previous research has found the MTurk worker to be less socially engaged and more likely to be introverted, or what might be expected of a frequent internet user (Casey et al, 2017; McCredie & Morey, 2019). Given the present research is interested in online consumers of customized apparel, this classification resembles the research population of interest and is therefore considered an appropriate convenience sample.

Extant literature has examined the data quality of responses received through MTurk. Previous literature has found that MTurk workers are more likely to speed through a survey (Smith, Roster, Golden, & Albaum, 2016), but are also attentive to specific questions (Hauser & Schwarz, 2016). Although MTurk is an anonymous platform and may be prone to false responses (Chmielewski & Kucker, 2020), most research suggests that with appropriate quality filters, attention checks, and screening methods responses are as reliable as other sources (e.g., Chmielewski & Kucker, 2020; Hauser & Schwarz, 2016; Smith et al., 2016). As recommended by previous literature, the present research instrument included quality check filters that incorporated free-text entry options and used statistically improbable responses in data screening (Chmielewski & Kucker, 2020), and an attention check was also included (Hauser & Schwarz, 2016). Additionally, respondents IP addresses were screened to verify location eligibility was met (Smith et al., 2016).

Survey Instrument

The survey developed for this research took an average of 11 minutes for the participants to complete and included five sections. These sections asked participants to provide information about their (1) MCA purchase patterns, (2) MCA related consumer characteristics, (3) sustainability related variables, (4) sustainable consumer behaviors, and (5) demographic information. Details about each section and measures used in survey instrument follow.

MCA purchase patterns. In addition to the cover letter, the survey began with a qualifying statement asking the participants to acknowledge that they have prior experience as a consumer of MCA. Because consumers may not have been familiar with the term “mass custom,” the survey used the term “customized apparel products” which was defined as “apparel items such as shirts, pants, dresses, skirts, and jackets for daily wear that have been customized in some way by the consumer prior to completing purchase.” A positive response (i.e., YES) enabled the participant to proceed to the full survey, a negative response (i.e., NO) terminated the survey; only completed surveys were eligible to receive the incentive.

Following a positive response to the qualifying statement, participants were asked to provide information related to their MCA purchase patterns. A total nine items were created based on a review of the literature and current MCA market to address the participants’ MCA purchase patterns. Three items were intended to capture self-reported behaviors of the segmentation basis variables related to frequency, amount, and duration of MCA purchases. The open-ended questions were: “how many times have you purchased customized apparel products over the past two years?,” “how many customized apparel products have you purchased over the past two years?,” and “in what year did you make your first customized apparel purchase?” Six additional items addressing (1) intended duration of use, (2) preferred customizations, (3)

percentage of wardrobe that is MCA, (4) what MCA retailers consumers have purchased from, (5) types of apparel products customized, and (6) why they purchase from these brands or retailers were included to build a robust and holistic consumer profile and provided more information to inform the exploration of sustainability-related variables. These qualitative data were also used as screener questions to ensure reliable participant responses representing actual MCA consumers.

MCA specific consumer characteristics. Consumer characteristics related to the online customization experience and resulting MCA product include their *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience*. These variables were addressed using measures identified through the literature review and will be described in the following sections. All items were measured with a seven-point Likert-type scale; participants were asked to identify their level of agreement with each statement (1 = strongly disagree, 7 = strongly agree).

Motivations for MCA Purchase. To measure the motivations of participants, 10-items were modified from the Consumer Perceived Value Tool (CPVT) introduced by Merle et al. (2010). Items were selected to capture all five dimensions of MC product benefits: utilitarian, uniqueness, self-expression, hedonic, and creative achievement. Example items included: “with the(se) customized apparel product(s) I will not look like everybody else” and “I can be creative while customizing what I wear.”

Satisfaction with the MCA Product and Customization Experience. A total of six items were modified from the literature to address participants’ satisfaction with the MCA product and customization experience. Two-items from the CPVT (Merle et al., 2010) designated as addressing utilitarian value were adapted for use as measures of satisfaction with the MCA

product. These items were: “the customized apparel products are exactly what I hoped for” and “the apparel products I created meet my expectations.” One item was modified from Franke & Schreier (2010): “I feel satisfied with the custom apparel products I have purchased”. Three items were created based on the literature to address satisfaction with the customization experience (Mugge et al., 2010; Wan et al., 2017). Example items included: “the customized apparel I have purchased better meets my style preferences than standardized apparel products” and “I have been satisfied with the degree of customization I am able to achieve in the products I have purchased.”

Sustainability related variables. The third section of the survey addressed the participants’ possible sustainability mindset by measuring *emotional product attachment* and *environmental attitudes*. All items were drawn or modified from the literature review and were measured using a seven-point Likert-type scale (1 = strongly disagree, 7 = strongly agree).

Emotional Product Attachment. A total of five items were intended to measure *emotional product attachment*. Four items were modified from Mugge et al. (2009). Example items include: “I have a bond with the customized apparel I have purchased” and “The customized apparel products I have purchased are very dear to me.” One additional item: “I feel connected to the customized apparel products I have purchased,” was created for the current study based on a review of the literature (Park & Yoo, 2018).

Environmental Attitudes. Environmental attitudes were measured using five items from Trivedi et al. (2018). Example items were “I am very concerned about the environment” and “humans are severely abusing the environment.”

Sustainable consumer behaviors. The fourth section of the survey addressed the participants’ sustainable apparel behaviors and general consumer behaviors. All items were

adapted from or created based on the literature and used seven-point Likert-type scales (1 = never and 7 = always) to assess how often participants engaged in specific sustainable behaviors related to apparel behaviors and more general sustainable behaviors.

Sustainable Apparel Behaviors. Sustainable apparel consumption behaviors were measured using seven items modified from Cho et al. (2015), such as “I purposefully select fabrics that require shorter drying time.” Three items modified from Razzaq et al. (2018) such as “I buy clothing which is produced in an environmentally friendly manner.” Two items were created based on a review of the literature: “I have my clothes repaired or mended to help them last longer” and “I wear second-hand or used clothing.”

General Sustainable Behaviors. General sustainable consumer behaviors were measured using eight items. Four items were adapted from Trivedi et al. (2018) such as “I buy environmentally friendly products” and “I recycle household waste.” Two items were adapted from Razzaq et al. (2018) “I use products I have purchased for as long as possible” and “I avoid purchasing products that are harmful to the environment.” Two items were created based on the literature review: “I commute via public transportation, carpool, or bicycle” and “I conserve household energy use.” Items for this section were selected based on sustainable consumer behaviors aimed at reducing environmental impacts, and were believed to be easy to understand concepts, therefore allowing participants to accurately assess their involvement in the behaviors.

Demographics. The final section included 10-items related to demographics and non-MCA related clothing experiences. Age, education, gender, and income were collected followed by two questions asking participants to indicate their general apparel purchasing behaviors: how much is spent and how many total items of apparel are purchased during an average 6-month period. Participants were asked to provide their best estimation of their height and weight, which

were used to calculate BMI. Four-items were created based on the literature review to measure participants' perceptions of the mass-produced apparel products commonly available on the market, such as "when shopping for clothes, I don't always find the size I need." These items were added to assess the body type construct outside of the BMI context. By examining the BMI alongside participants self-reported fit and sizing issues, the body type characteristic can be examined more holistically and is not limited by a standardized understanding of body shapes and sizes.

Pilot test

The survey was finalized, and pilot tested in the early spring of 2019. Four participants were recruited through personal and secondary connections of the primary researcher known to meet the eligibility requirements for survey participation. The responses were recorded but not included in final analysis as a technical error in the survey logic prevented the first two respondents from fully responding to all questions. Technical issues and grammatical flaws were corrected for final survey distribution.

Data Collection

Data collection was conducted using the MTurk platform, with the initial batch of survey responses received between April 23-25, 2019 collecting a total of 500 responses. The MTurk platform requires the "requester" to approve or reject "workers" before incentives are received for completing a "task." In reviewing the responses received in this initial batch, it was found that many responses were not usable due to failed quality checks that had been written into the survey without survey termination logic, thus enabling survey completion. Worker responses were rejected for one or more of the following criteria: failed attention check; year of first MCA

purchase not given as four-digit year format; and/or percentage of apparel types in wardrobe not equaling a total of 100. From these failed quality checks, 160 MTurk responses were rejected and not considered for further analysis, resulting in 340 accepted responses needing further examination and cleaning. Owing to the possibility of having additional unusable responses, it was determined by the researcher and advisor that a second batch of collection would be necessary in order to ensure sufficient data for analysis.

Prior to conducting the second batch of data collection, the university's IRB office was contacted and approved of revised measures to add termination logic to the previously identified quality check items (otherwise the survey was identical), thus limiting the number of rejected workers (i.e., unusable responses), see Limitations section for further details about the MTurk experience. The second batch of data collection was processed (collected) on May 22, 2019, receiving 166 responses that were all approved for further analyses and screening.

Data Screening and Consolidation

Before data analysis began, collected responses were examined and screened by the researcher to identify the usable responses. Exploratory factor analysis was then conducted to ensure the two batches of collected responses could be combined for further analysis. The data screening process will be described in the subsequent sections.

Data screening and inclusion criteria. A total of 506 responses were retained and further examined and screened for usability by the researcher and advisor. The researchers analyzed recorded answers related to consumers' customization purchase history, including the duration of MCA purchase behavior, and the frequency and amount of MCA purchases for the previous two years. Recorded answers relating to MCA retailers purchased from, and the

specific MCA items purchased were also reviewed for reliability of participant responses. These inclusion criteria will be discussed in detail in the following paragraphs.

Duration of MCA purchase behavior. Responses from MTurk workers reported experience with customized apparel going back to the mid-1980s, however the researchers agreed upon a maximum duration of 15 years (i.e., 2005) of MCA purchase experience. This outer bound for data was established based on the historical timeline of e-commerce sales; United States Census Bureau (USCB) data for e-commerce retail sales began in 1998 with first reported clothing and accessories (NAICS code 448) e-commerce sales figures estimated at \$12 million out of a total sector sales estimate of \$149.1 million (approx. 0.01% of total sales) (USCB, 2020). Estimates for the clothing sector were not reported for the years 1999 – 2003, and estimates for the years 2004 , 2005, and 2006 are relatively stable (\$1,119,000,000; 1,241,000,000; and \$1,177,000,000, respectively) accounting for approximately 0.06% of total clothing sector retail sales, with growth in the sector observed after 2006 (USCB, 2020). These pre-2005 customizer responses were also reviewed individually with recorded answers indicating purchases were made outside of an online platform. Additionally, Etsy, the online marketplace for hand-made (custom) and vintage goods was launched in 2005 (Ortland, 2006) and therefore the year was deemed an appropriate indicator of online apparel shopping becoming mainstream.

Frequency and amount of MCA purchases. Further parameters for data inclusion were established relating to the frequency and amount of MCA purchases. With consideration to the proposed cluster analysis, the researchers agreed to eliminate outlier responses based on reviewing the means and standard deviations of the recorded responses; outliers were determined to be potentially detrimental to the proposed cluster analysis. In reviewing frequency of MCA purchases, nine responses indicated purchasing MCA items more than 25 times in the two years

prior to survey and in regard to amount of MCA purchases for the same two-year period, seven responses indicated more than 50 items purchased. Of these responses five indicated both frequency and amount above 25 and 50, respectively. All responses indicating high frequency and/or amount were individually reviewed, with some showing questionable responses relating to MCA retailers and/or items. Therefore, the upper bounds for frequency and amount were established at the 25 times, and 50 item thresholds. After a full review of the recorded responses the final dataset between two batches of data collection resulted in 318 usable responses.

Data analysis with Combined Datasets. Due to data being collected in two batches on the MTurk platform, datasets had to be combined. To ensure compatibility in combining datasets, a statistician at the researcher's university was consulted to provide clarification and procedure for combining the datasets. Because both batches used identical survey questions, it was determined that the results of factor analysis comparison would provide reliable results for combining datasets. This method is similar to the exploratory factor analysis stage of a multi-group confirmatory factor analysis, which is commonly used in consumer behavior research to combine data sets for structural equation modeling (a method beyond the scope of this thesis). For example, El Hedhi & Chebat (2009) collected two datasets in different locations using the same survey measures in the creation of a scale for shopper-based mall equity, and Munim & Noor (2020) collected two datasets one month apart with different populations using the same survey measures to understand public transit users' perceptions of hybrid bus service.

Using IBM SPSS statistical analysis software, *a priori* factor analysis was conducted on the multi-item scales from the survey for the variables: *motivations for MCA purchase*, *satisfaction with the MCA product and customization experience*, *emotional product attachment*, *environmental attitudes*, *sustainable apparel behavior*, and *general sustainable behavior*.

Principal component extraction was based on eigenvalues greater than one, and varimax rotation was applied as needed to the model solutions to define sub-factor groups. Reliability analysis was conducted using Cronbach's alpha. Factor analysis was conducted on each dataset (collection date) individually and results were compared for consistency. Factor analysis using the combined datasets was also compared to individual dataset results (i.e., factor loadings, variance explained, and reliability). The factor analysis comparison process will be described briefly here, full comparison results are presented in Appendix C, and final factor analysis results of the combined dataset are presented in Chapter IV Results.

For the variables of *satisfaction with the MCA product and customization experience* and *environmental attitude*, this factor analysis was simple; all survey items loaded acceptably high (at or above .69) and individual items compared between the individual and combined datasets had a factor loading range of no more than 0.07. Variances on the single factor solutions explained more than 60% variance with a less than 3% difference in the variances between dataset for both variables (2.55% for *satisfaction with the MCA product and customization experience* and 1.36% for *environmental attitudes*). Reliabilities were acceptably high, (Boateng, Neilands, Frongillo, Melgar-Quiñonez & Young, 2018) for both variables with Cronbach's alpha at or above .87, and no more than .01 difference between individual datasets. All other variables of interest followed the same process but required additional screening as results were not as consistent between datasets.

Screening included ensuring all items loaded acceptably high for the observation sets. If an individual item loaded below acceptable tolerance (Boateng et al., 2018) it was removed and factor analysis re-run using the remaining items. For example, of the six items intended to measure *emotional product attachment* the item "customized apparel products I have purchased

do not have a special meaning for me” had a low factor loading in dataset 1 and was the sole item to load acceptably high on a second component in dataset 2. This item was the only reverse coded item, or non-positive statement. After this item was removed, factor analysis was conducted again, resulting in a single factor solution that was congruent for all datasets, with all items loading acceptably high, with similar variance and reliability scores.

Factor analysis comparison of the items intended to measure *sustainable apparel behaviors* variable yielded the most discrepancies. On the first iteration the individual datasets both resulted in three-factor solutions, one six-item factor was clear and consistent between datasets, however two items were removed due to cross-loading scores (Boateng et al., 2018) (“I dispose of clothing in an environmentally friendly manner,” and “I buy higher quality, more durable clothes,” respectively). The remaining ten-items were used for a second iteration of factor analysis comparison and yielded congruent and reliable two-factor solutions for both datasets. Factor loadings were all above 0.59. The same six-item factor item (SAB1) was confirmed and showed minimal range for factor loadings across the observations sets. The other four items all loaded acceptably high on a second factor (SAB2); however, with more variability in the factor loading scores between the individual datasets. Although individual items in SAB2 loaded with more variability (range: 0.08 – 0.22), the variance explained showed minimal differences. Cronbach’s alpha for SAB2 were .72 for dataset one and .67 for dataset 2, which is just below generally accepted tolerance (.70) (Boateng et al., 2018); however, previous literature has noted that in some cases reliability is considered acceptable above .60 (Buffington, 2010).

Data Analysis to Address Research Question One

The first research question aims to identify the contemporary MCA consumer regarding MCA-related characteristics and demographic variables (i.e., *income, education, and body*

type/BMI). Thus, data analysis started by forming a profile of the participants through descriptive statistics using the collected demographics and MCA purchase patterns (i.e., *duration, frequency, and amount*). General apparel purchasing behaviors (i.e., total apparel expenses, and total apparel items purchased), and *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience* are also addressed in the participant profile and enable the identification of current MCA consumers' characteristics. Additionally, cluster analysis and t-test comparisons of the resulting clusters provided additional details to the participant profile and contribute to our understanding of existing MCA consumers.

Cluster analysis. Gwozdz et al. (2017) utilized cluster analysis to identify clusters of apparel consumers on the basis of their purchase behaviors using frequency and dollar amount to define groups; using this method the authors were able to present possible interventions tailored to individual clusters to encourage more sustainable consumption behaviors. For this research cluster analysis (market segmentation) utilized MCA purchase patterns as a basis for segmentation with *frequency of MCA purchases, amount of MCA items purchased, and duration of MCA purchase behaviors* as the intended behaviors. In exploring the initial dataset, a strong positive correlation was observed between the *frequency of MCA purchases* and *amount of MCA items purchased* ($r = .64, p < .01$), suggesting that the creation of an interaction variable (*items per purchase(IPP)*) would provide a cleaner approach for segmentation as highly correlated variables may indicate redundant information (Dolnicar et al., 2018). The *IPP* interaction variable was derived as an evaluation of the *amount of MCA items purchased* divided by the *frequency of MCA purchases*. The interaction variable, therefore reduced the number of segmentation basis variables while maintaining the intended purpose of using purchasing patterns for achieving a general understanding of the market as suggested by Wind (1978).

Data Analysis to Address Research Question Two

The second research question considers the extent to which sustainability-related variables (i.e., *emotional product attachment*, *environmental attitudes*), and behaviors (i.e., *sustainable apparel behaviors*, and *general sustainable behaviors*) might be displayed by MCA consumers and how they might influence their MCA purchase patterns and characteristics. In answering this question, cluster analysis results and comparisons of the clusters relating to sustainability variables and behaviors were used to identify whether more experienced MCA consumers might exhibit sustainable attitudes and/or behaviors. Multiple regression analyses were conducted to expand on the cluster comparison results and examine the relationship between sustainability variables and MCA purchase patterns and characteristics. Additionally, correlation analyses were conducted to examine possible associations between all variables studied.

CHAPTER IV – RESULTS

This exploratory analysis of the current MCA consumer market was interested in identifying MCA consumer characteristics such as *motivations for MCA purchase, satisfaction with the MCA product and customization experience*, and demographic factors (i.e., *income, education, body type/BMI*), and also the potential associations between MCA purchase patterns and environmentally sustainable consumer variables and behaviors such as *emotional product attachment, environmental attitudes, sustainable apparel behaviors*, and other *general sustainable behaviors*. In order to identify and explore the MCA consumer market, an online survey was designed on Qualtrics and distributed through the Amazon Mechanical Turk (MTurk) platform. The finalized survey was distributed in the spring of 2019 using the MTurk platform and resulted in 318 usable responses.

Profile of the Participants

A total of 318 participants were included in analysis; the average age was 33.26 years old, with a range of 20-80 years of age; 76.5% of respondents were 37 or younger at the time of the survey. Gender distribution of participants was slightly skewed toward men (n = 176) compared to women (n=140); two participants identified as non-binary. A Bachelor's degree was the highest level of education achieved by 45.1% of respondents, with 90.9% of respondents at or below the bachelor's degree. Average income reported was \$40,000-\$59,999, with nearly half (48.6%) of respondents indicating an income between \$20,000 and \$59,999; 82.1% reported earning less than \$80,000 annually. The average BMI of participants was 26.67, with an average reported height of 67.67" (5' 7.67") and average weight of 174.52 lbs. Descriptive statistics of demographic data of the participants are shown in Table 4.

Table 6. Descriptive Statistics of Participant Demographics (n=318)

Characteristics	(n)	%
Age		
Mean	33.25	
Range	20 – 80	
Education		
High School/GED	38	11.9%
Some College	61	19.2%
Associate’s	47	14.8%
Bachelor’s	143	45.0%
Master’s	25	7.9%
Doctoral	2	0.6%
Professional	2	0.6%
Gender		
Female	140	44.0%
Male	176	55.3%
Other	2	0.6%
Income		
Less than \$20,000	49	15.4%
\$20,000 - \$39,999	80	25.2%
\$40,000 - \$59,999	75	23.6%
\$60,000 - \$79,999	58	18.2%
\$80,000 - \$99,999	34	10.7%
\$100,000 - \$149,999	18	5.7%
\$150,000 - \$199,999	4	1.3%
Body Mass Index (BMI)		
Mean BMI	26.67	
Mean Height, (in.)	67.64	
Mean Weight (lbs.)	174.52	
Underweight (below 18.5)	7	2.24%
Normal (18.5 – 24.9)	135	43.27%
Overweight (25.0 – 29.9)	96	30.77%
Obese (30.0 and above)	74	23.72%

MCA purchase patterns. Participants’ purchase patterns relating to MCA specific consumption (i.e., *frequency, amount, duration, items per purchase*), as well as general apparel purchase behaviors (i.e., general clothing expenditures for a six-month period, and general

apparel items purchased in a six-month period) are detailed in the following sections. Full descriptive statistics for these variables can be found in Table 5.

Table 7. Participants' MCA Purchase Experience and General Apparel Purchase Behaviors

Survey Item	Mean	Median	Mode	Min.	Max.
Frequency of MCA Purchases (Times)	4.32	3.00	2	1	25.00
Amount of MCA Purchases (Items)	5.54	3.00	2	1	50.00
Years since First MCA Purchase (Duration)	3.88	2.00	1.0	.5	15.00
Items per Purchase (IPP)	1.34	1.00	1.00	.15	10.00
How long do you keep or intend to keep your customized apparel products? *	5.84	5.50	4	1	12.00
Approximately what percentage of your wardrobe is Customized apparel products?	15.58	10.00	5.0	.0	100.00
Average 6mos. all apparel purchases (USD \$)	419.50	250.00	200.00	0	5000.00
Average 6mos. all apparel purchases (Items)	9.58	6.00	10	0	70.00

Table Note. *The survey item "How long do you intend to keep your customized apparel products?" was coded as: 1=less than one year; 2=1-2 years; 4=3-4 years; 6=5-6 years; 8=7-8; 10=9-10; 12=11+ years

Frequency of MCA Purchases. Descriptive statistics of the participants' experience with apparel mass customization showed the average *frequency* of customized apparel purchase was 4.32 times over the two-year period, with open-ended answers ranging from 1-25 times, see Table 5. About one-quarter of participants (23.6%, n=75) reported purchasing customized apparel products two times in the past two years, while 10.4% (n=33) reported a purchase frequency of 10 times. Fifty-five percent of participants (n=175) reported purchasing MCA three times or less in the past two years. See Figure 2 for distribution of MCA purchase *frequency* results.

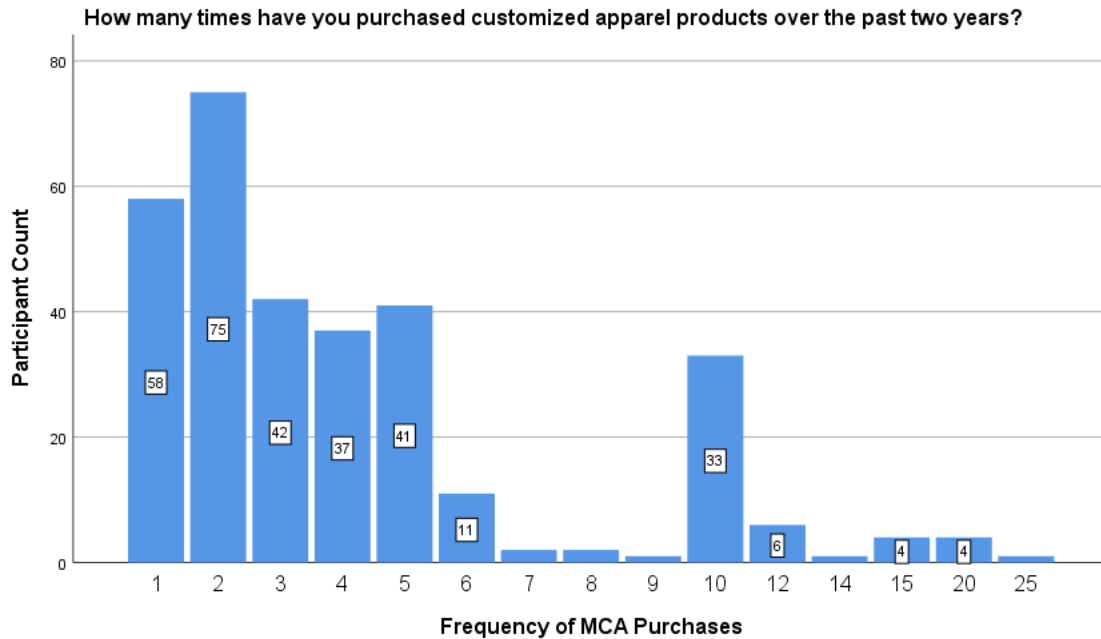


Figure 2. Distribution of Participants' MCA Purchase Frequency

Amount of MCA Purchases. The *amount of MCA item purchased* over the past two years were also open-ended responses, with recorded usable responses ranging from 1 to 50 items purchases. The average number of items purchased was 5.54, while the most frequent response was two items (24.5% of participants, n=78), see Table 5. Results showed that 39.31% (n=125) of participants reported purchasing two or fewer items in the previous two years. See Figure 3 for distribution of *amount* of MCA purchases results.

Duration of MCA Purchase Behaviors. Respondents' *duration* of experience purchasing customized apparel online ranged from less than a year to 15 years. The average length of time consumers had experience with purchasing customized apparel items was 3.88 years, and the most common answer reported answer was one year (28.5%, n=91). Results indicated a relatively new-to-the-scene demographic with one-hundred and sixty-one respondents (50.63%) reporting the duration of their MCA purchase experience at or below two years. See Table 5 and Figure 4 for more details on the *duration* variable.

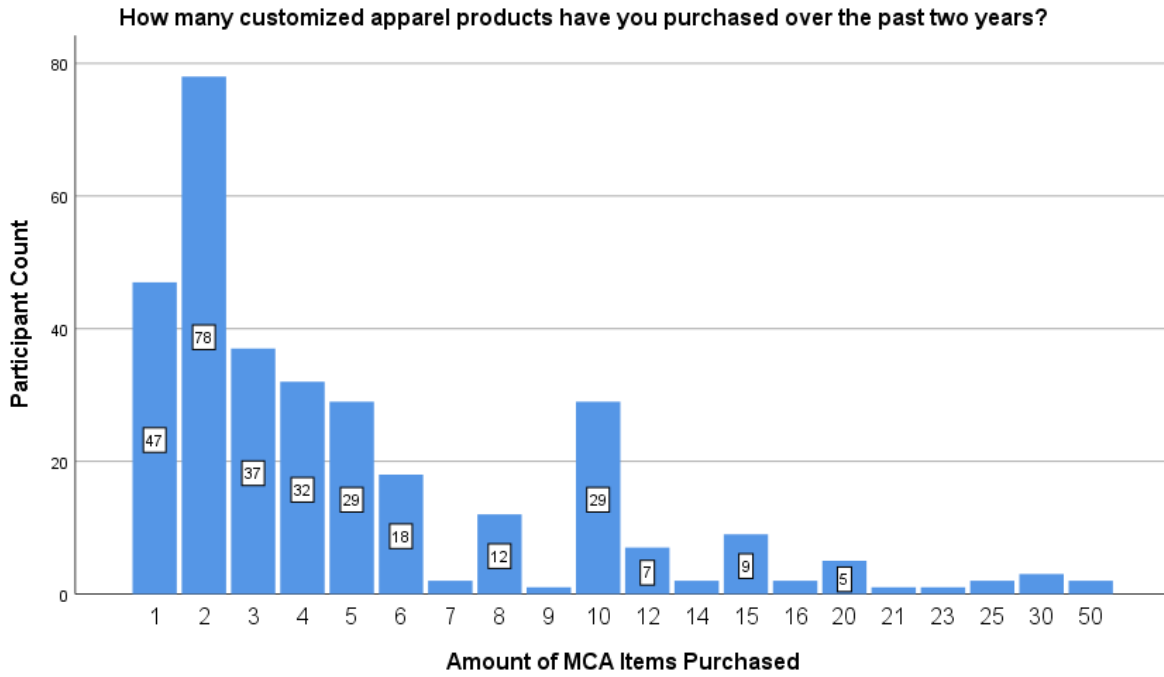


Figure 3. Distribution of Participants' Amount of MCA Purchases

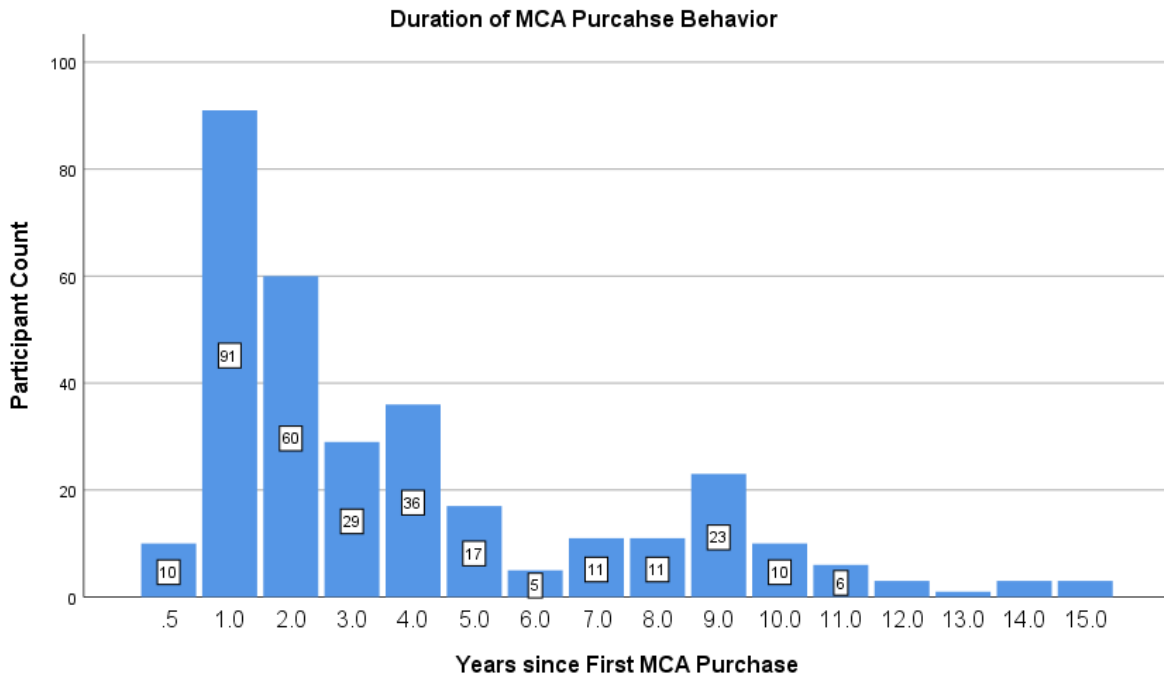


Figure 4. Distribution of Participants' Duration of MCA Purchase Behavior

Items per purchase (IPP). Descriptive statistics showed that the average IPP of participants was 1.34 MCA items per purchase (see Table 5), with 1 IPP being the most common response (n = 191 or 60.10%) regardless of how long participants had been MCA consumers, see Table 6.

Table 8. Cross-tabulation for IPP by Duration of MCA Purchases

	Years Since First MCA Purchase (Duration)															Total	
	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
.15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
.20	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
.25	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	3
.33	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	4
.40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
.44	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
.50	0	0	1	0	2	2	1	1	0	0	0	0	0	0	0	0	7
.60	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
.67	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	5
.70	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
.75	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
.80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
.86	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
1.00	8	69	34	16	15	8	2	4	7	11	7	3	2	1	2	2	191
1.14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1.20	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	4
1.25	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
1.33	0	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	5
1.40	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
1.43	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1.50	0	4	2	1	1	1	0	1	1	0	1	0	0	0	0	1	13
1.60	0	0	3	1	1	0	0	0	2	0	0	0	0	0	0	0	7
1.67	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	3
1.75	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
1.80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
1.92	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2.00	0	6	6	2	5	1	0	1	0	5	1	0	0	0	0	0	27
2.33	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2.50	0	0	2	2	3	2	0	0	0	0	0	0	0	0	0	0	9
2.67	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3.00	0	4	1	0	2	0	0	0	0	3	0	1	0	0	0	0	11
4.00	1	0	0	1	2	0	0	0	0	1	0	0	0	0	0	0	5
5.00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
10.00	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Total	10	91	60	29	36	17	5	11	11	23	10	6	3	1	2	3	318

Cross-tabulation results revealed 34.91% (n = 111) of participants had less than two years of experience and purchased one item per purchase. These findings indicated that a large portion of survey responses were based off one or two online mass custom apparel purchasing experiences and may suggest that MCA as a consumer market is still in early stages. Further discussion will be provided in the Discussion and Conclusions chapters.

MCA retailers, products and reasons for purchase. Participants responded to open-ended questions about the specific MCA retailers patronized, the MCA products being purchased, and their reasons for purchasing MCA products. The most commonly cited source for MCA purchases was Etsy (n=41; a marketplace for handmade and vintage items; many of the sellers offering customization services for their handmade products, including apparel), followed by CustomInk (n=35), Nike (n=25), and Amazon (n=20). Amazon is one of the United States' largest online marketplaces for all types of consumer goods, including a section devoted to "Customizable Apparel"; "Amazon's Custom Store" (Amazon, n.d.) operates as a marketplace for custom apparel manufacturers, including brands such as eShakti, Printualist, CalmApparel, and Custom Apparel CA. Other commonly cited retailers included Designhill (n=17), Spreadshirt (n=16), 4 Imprint (n=14), Underground Shirts (n=13), eShakti (n=10), and Indochino (n=9). Only one survey respondent cited Frilly as a source for their MCA purchases. See *Figure 5*.

Tops were the most commonly cited MCA product category with 239 responses mentioning some type of shirt; more specifically, "shirt(s)" (n=119), t-shirts (n=94), dress shirts (n=17, including button down, button front, and collared), tank tops (n=4), blouses (n=7), polos(n=6), and and/or tops (n=7). Jackets, sweatshirts/hoodies, and other outer layers (e.g., sweaters, and pullovers) were mentioned by 49 participants. Suits were mentioned by 25

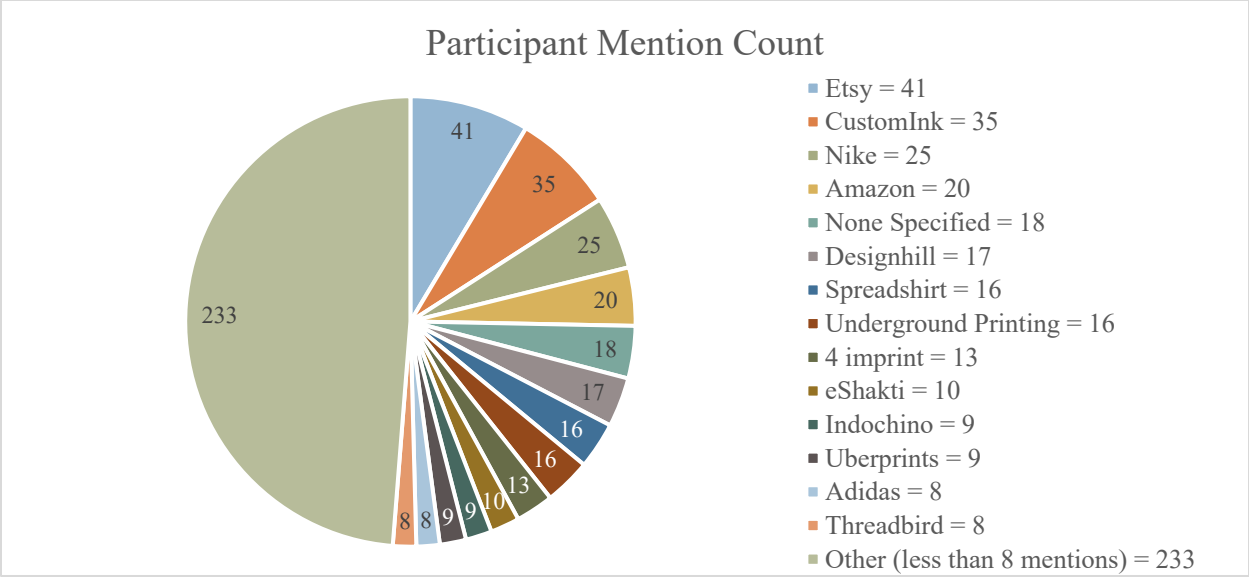


Figure 5. MCA Retailers Purchased from by Participants

participants. Pants were mentioned in 53 survey responses (including “trousers,” “dress pants,” “slacks,” “sweatpants,” “cargo pants,” and “chinos”), while “jeans” were mentioned 15 times. Other bottoms cited in the data sample included shorts (n=5), and skirts (n=13). Dresses appeared in 38 survey responses. Shoes/sneakers were cited by 37 participants, while hats were mentioned in 34 surveys. See Figure 6.

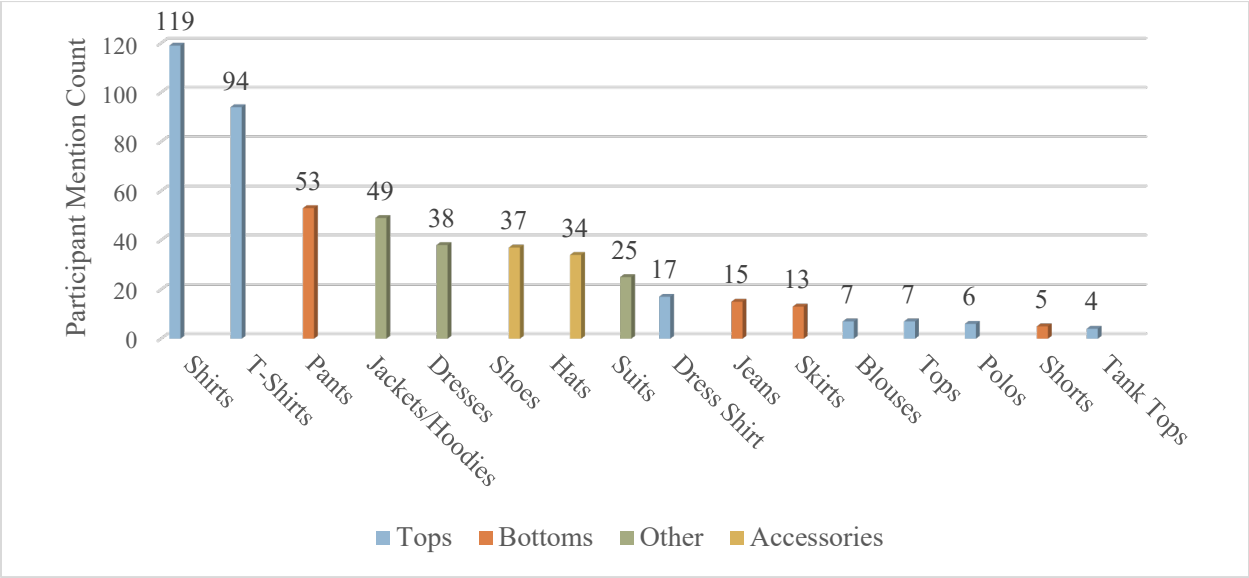


Figure 6. MCA Products Purchased by Participants

Participants on average cited two reasons for making MCA purchases. These included reasons typical of any apparel purchase such as quality of materials and/or products (n=85), price (n=70), style (e.g., options, designs; n=58), fit (n=53), and customer service (n=80). Reasons for purchase that were specific to the MCA experience included: options/flexibility in customizing (n=83), the ability to get a unique product (n=36), a fun and/or creative design (shopping) experience (n=12), meeting individual needs (e.g., putting personal logos onto apparel for business purposes; n=50), and an easy to use service/platform (n=27). Other less commonly cited reasons for purchasing included: recommendations from friends and/or family, wanting to support the artists/designers (on sites like Etsy and Threadbird), supporting local/small businesses, and finding sellers to be ethical or transparent. See *Figure 7*.

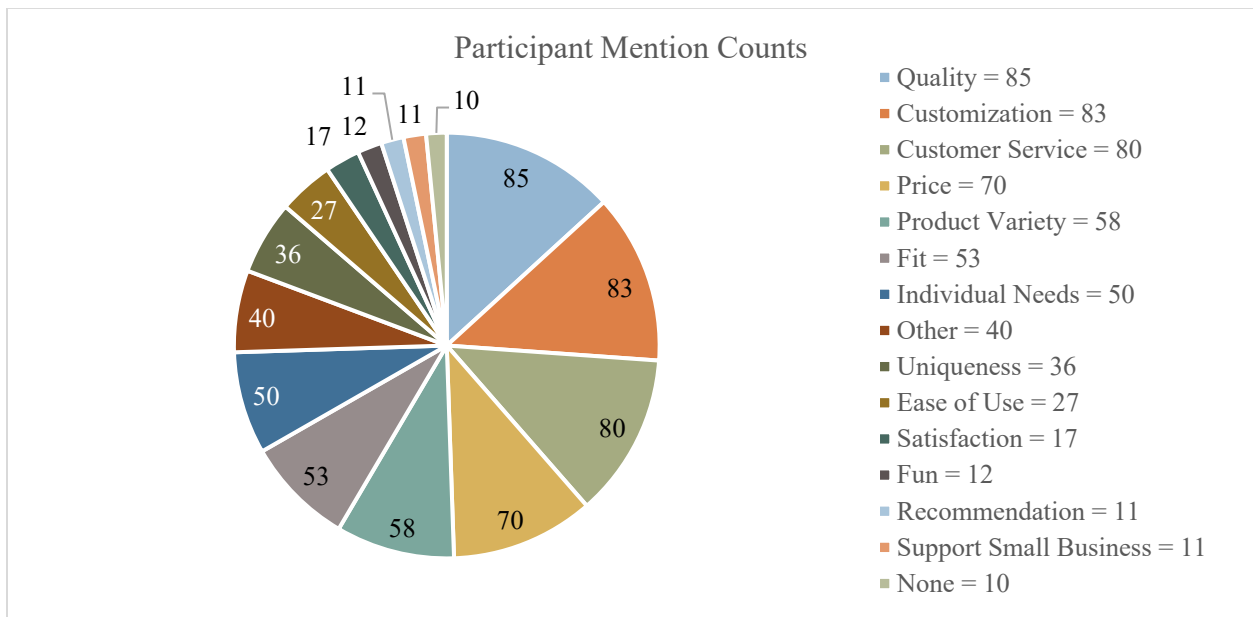


Figure 7. Participants' Reasons for MCA Purchases

General apparel purchase behaviors. Two survey items asked participants about their overall apparel purchasing behaviors; these items requested information about their average six-month spending habits, and the average number of apparel items purchased in six-month period. Results showed an average six-month expenditure for all apparel purchases to be \$419.50

(USD), with participants purchasing an average of 9.58 apparel items. See *Table 5, Figures 8 and Figure 9.*

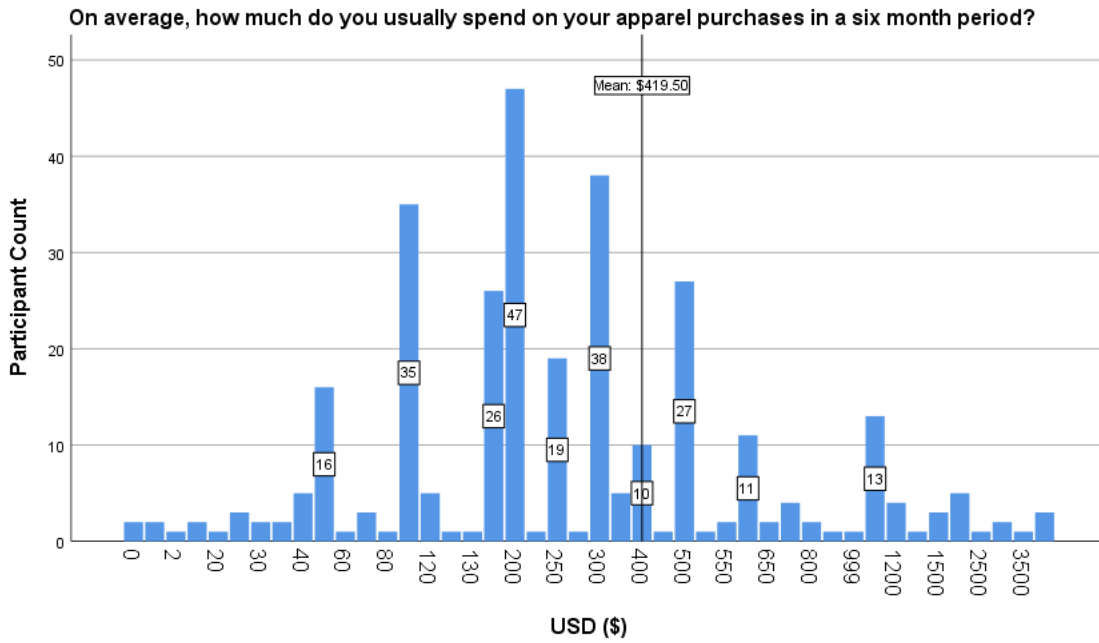


Figure 8. Participants' Average 6-month General Apparel Expenditures (N=318)

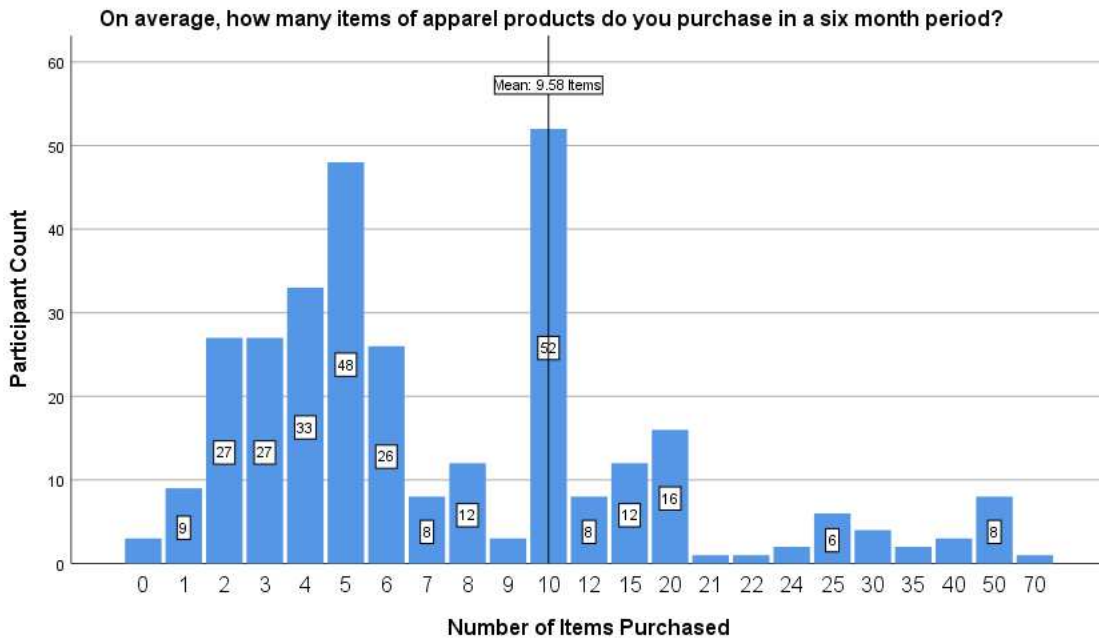


Figure 9. Participants' Average 6-month General Apparel Items Purchased (N=318)

Final Factor Analysis

As discussed in Methods, a multi-stage confirmatory factor analysis was conducted using the IBM SPSS statistical analysis software. This approach allowed for consolidation of the two datasets (batches) and resulted in the definition of final composite variables for additional analysis to answer the research questions of this thesis. Principal components factor analysis was conducted using an eigenvalue of 1 or greater and varimax rotation as needed to define model sub-factor solutions. Factor loadings were deemed acceptable at or above .50, which is higher than the .40 recommended by Boateng et al. (2018). Variables of interest confirmed through factor analysis included *motivations for MCA purchases, satisfaction with MCA product and experience, emotional product attachment, sustainable apparel behaviors (SAB), and general sustainable behaviors (GSB)*. Cronbach's alpha was used to assess scale reliability; all analyzed variables had acceptably high reliabilities, above .70 (Boateng et al., 2018). The final results of the combined dataset factor analysis can be seen in Tables 7-13 and will be discussed in the following paragraphs.

Motivations for MCA purchase. Ten survey items were used to measure respondents' *motivations for MCA purchase*. The combined datasets emerged as one factor, all loading acceptably high (Boateng et al., 2018); however, the item "with these customized apparel products, I have a small element of differentiation compared to others" was removed from this analysis due to low factor loadings in the individual datasets. The factor analysis was conducted again with the remaining 9 items and all items loaded acceptably high on a single factor solution for the combined and individual datasets. The final combined result showed a single factor accounting for 49.74% of the total variance and Cronbach's alpha reliability of .87. Therefore, the nine survey items were combined into a single "*motivations for MCA purchase*" variable,

calculated as the average of all motivational survey items by respondent. See Table 7 for full factor loadings.

Table 9. Factor Analysis and Scale Reliability for Motivation Variable

<i>Motivations for MCA purchase</i>	<i>Factor Loadings</i>	<i>Variance Explained</i>	<i>Reliability</i>
		49.74%	.87
<i>Item 1. Apparel customization has allowed me to create products that are most adapted to what I am looking for</i>	.63		
<i>Item 2. The customized apparel products I have purchased are products that I really wanted to have.</i>	.63		
<i>Item 3. With these customized apparel products, I will not look like everybody else.</i>	.67		
<i>Item 4. With the customization website (or app), I could design apparel that others will not have.</i>	.70		
<i>Item 6. The customized apparel products convey exactly who I am.</i>	.64		
<i>Item 7. I found it fun to customize the apparel products.</i>	.76		
<i>Item 8. I really enjoyed being able to customize what I wear.</i>	.78		
<i>Item 9. The customization platform gave me a lot of freedom in the creation of the apparel products, and I really enjoyed it.</i>	.78		
<i>Item 10. I can be creative while customizing what I wear</i>	.74		

Table Note. Item 5 “with these customized apparel products, I have a small element of differentiation compared to others” was removed from analysis.

Satisfaction with the MCA product and customization experience. The survey included six items to measure respondents’ satisfaction with the MCA products they have purchased as well as the customization experience itself. Factor analysis of the combined datasets showed all items merged into one factor, accounting for 61.40% of the total variance, with all items loading acceptably high (above .70). Overall reliability of the single “satisfaction” factor solution had a Cronbach’s alpha reliability of .87. Composite scores were created as the average of all six items representing the factor “*satisfaction with the MCA products and experience.*” See Table 8.

Table 10. Factor Analysis and Scale Reliability for Satisfaction Variable

<i>Satisfaction with the MCA product and customization experience</i>	<i>Factor Loadings</i>	<i>Variance Explained</i>	<i>Reliability</i>
		61.40%	.87
<i>Item 1. The customized apparel products are exactly what I had hoped for.</i>	.78		
<i>Item 2. The apparel products I created meet my expectations.</i>	.80		
<i>Item 3. I feel satisfied with the customized apparel products I have purchased.</i>	.80		
<i>Item 4. I am happy with the experiences I have had customizing apparel products.</i>	.81		
<i>Item 5. The customized apparel I have purchased better meets my style preferences than standardized apparel products.</i>	.70		
<i>Item 6. I have been satisfied with the degree of customization I am able to achieve in the products I have purchased.</i>	.81		

Emotional product attachment. *Emotional product attachment* was measured in the survey with six-items; factor analysis showed all six items correlated around one factor accounting for 59.03% of the total variance; however, the item “Customized apparel products I have purchased do not have a special meaning for me” was removed due to low factor loading. The remaining five items were re-analyzed with the new model showing one component explaining 70.68% of the total variance, and all items loaded above .73, resulting in overall reliability of .90. See *Table 9* for factor analysis results. The variable “*emotional product attachment*” was created as an average score of the five-item single-factor solution.

Table 11. Factor Analysis and Scale Reliability for Emotional Product Attachment Variable

<i>Emotional Product Attachment</i>	<i>Factor Loadings</i>	<i>Variance Explained</i>	<i>Reliability</i>
		70.68%	.90
<i>Item 1. I have a bond with the customized apparel I have purchased.</i>	.81		
<i>Item 3. The customized apparel products I have purchased are very dear to me.</i>	.88		
<i>Item 4. I am very attached to the customized apparel I have purchased.</i>	.90		
<i>Item 5. I feel connected to the customized apparel products I have purchased.</i>	.86		
<i>Item 6. I will keep my customized apparel products longer than apparel that was already made when I bought it</i>	.73		

Table Note. Item 2 “Customized apparel products I have purchased do not have special meanings for me” was removed from analysis

Environmental attitudes. The survey included five items to measure respondents' environmental attitudes. All five items converged on a single factor, accounting for 70.52% of the total variance, with all items loading above .80. The “*environmental attitudes*” variable was created by obtaining the composite score of the average of the five survey items. Cronbach's alpha for this variable was .90. See *Table 10* for full factor analysis details.

Table 12. Factor Analysis and Scale Reliability for Environmental Attitudes Variable

<i>Environmental Attitudes</i>	<i>Factor Loading</i>	<i>Variance Explained</i>	<i>Reliability</i>
		70.52%	.90
<i>Item 1. I am very concerned about the environment.</i>	.82		
<i>Item 2. I would be willing to reduce my consumption to help protect the environment.</i>	.81		
<i>Item 3. Major political change is necessary to protect the natural environment.</i>	.86		
<i>Item 4. Major social changes are necessary to protect the natural environment.</i>	.89		
<i>Item 5. Humans are severely abusing the environment.</i>	.82		

Sustainable apparel behaviors. The survey included 12 items meant to measure respondents' sustainable apparel behaviors. Two items were removed during EFA comparison (discussed in the Methods chapter) and the remaining ten-items emerged on a two-factor solution, representing a cumulative variance of 59.02% with all items loading acceptably high (above 0.62). Factor 1 included six items, such as: “I buy clothing that is made with recycled content” and “I purposely select fabrics that require cooler washing temperature.” The factor formed from these items will be referred to as “*SAB1 pre-purchase behaviors.*” Factor 2 included four items, such as “I have my clothes repaired or mended to help them last longer” and “I reuse clothing products for other purposes to get the most out of them”; this factor is termed “*SAB2 post-purchase behaviors.*” Reliability scores of Cronbach's alpha for the two factors were .87 and .71, respectively. Two composite scores were created for *SAB1 pre-purchase behaviors*

and *SAB2 post-purchase behaviors* and were retained for additional analysis. See *Table 11* for details.

Table 13. Factor Analysis and Scale Reliability for Sustainable Apparel Behaviors

<i>Sustainable Apparel Behavior</i>	Factor Loadings	Variance Explained	Reliability
<i>Factor 1 – Pre-Purchase Behavior</i>		46.01%	.87
<i>Item 1. I buy clothing that is made with recycled content.</i>	.77		
<i>Item 2. I buy clothing that is made of organically grown natural fibers.</i>	.80		
<i>Item 3. I buy clothing which is produced in an environmentally friendly manner.</i>	.79		
<i>Item 5. I purposely select fabrics that require cooler washing temperature.</i>	.80		
<i>Item 6. I purposely select fabrics that require shorter drying time.</i>	.81		
<i>Item 7. I purposely select fabrics that require less ironing.</i>	.62		
<i>Factor 2 – Post-Purchase Behavior</i>		13.01%	.71
<i>Item 8. I donate my clothes when I no longer use them.</i>	.72		
<i>Item 9. I reuse clothing products for other purposes to get the most out of them.</i>	.68		
<i>Item 10. I wear second-hand or used clothing.</i>	.74		
<i>Item 11. I have my clothes repaired or mended to help them last longer.</i>	.65		

Table Note. Item 4. “I dispose of clothing in an environmentally friendly manner”, and Item 12. “I buy higher quality, more durable clothes,” were removed from analysis.

General sustainable behaviors. The eight survey items intended to measure participants’ general sustainable behaviors were analyzed using the factor analysis method described previously. The initial results of the combined datasets showed two components, with the second factor including only one item: “I use products I have purchased for as long as possible.” This item was therefore removed and analysis re-run. In the second iteration of exploratory factor analysis, all items converged on a single factor, but the item “I commute via public transportation, carpool, or bicycle” was removed for low loading. The remaining six-

items were reanalyzed, and an acceptable one factor solution emerged for all three datasets. The six-items explain 55.70% of the total variance with all items loading above 0.63. The overall reliability of the solution had a Cronbach’s alpha of .83. See *Table 12* for details. The composite score of the “*general sustainable behaviors*” (*GSB*) variable was calculated for each participant as an average of the final six items for further analysis.

Table 14. Factor Analysis and Scale Reliability for General Sustainable Behaviors Variable

<i>General Sustainable Behavior</i>	<i>Factor Loadings</i>	<i>Variance Explained</i>	<i>Reliability</i>
		55.70%	.83
<i>Item 1. I buy environmentally friendly products.</i>	.84		
<i>Item 2. I buy organic food.</i>	.71		
<i>Item 3. I use products made from recycled materials (e.g., post-consumer paper products).</i>	.78		
<i>Item 4. I recycle household waste.</i>	.65		
<i>Item 5. I conserve household energy use. (e.g. electricity).</i>	.63		
<i>Item 6. I avoid purchasing products that are harmful to the environment.</i>	.85		

Table Note. Item 3 “I use products I have purchased for as long as possible” and Item 6 “I commute via public transportation, carpool, or bicycle” were removed from analysis.

Participant Group Means for Variables of Interest

Based on the variables created through the factor analysis and reliability check, descriptive statistics was conducted. These results provided preliminary details for addressing both research questions of the study. All variables were based on a scale of 1-7, with 1 representing strong disagreement and 7 representing strong agreement with survey statements.

Descriptive statistics showed that the participants had generally positive *motivations for MCA purchase*, and *satisfaction with the MCA products and experience* (mean scores were 5.61 and 5.73, respectively). *Emotional product attachment* of participants towards their MCA products had an average variable score of 5.16, while *environmental attitudes* were slightly more

positive (5.43). These four variables of interest showed a general trend of positive experiences and attitudes towards MCA products. However, mean scores for the sustainable behavior indicators (i.e., *SAB1 Pre-Purchase Behaviors*, *SAB2 Post-Purchase Behaviors*, and *General Sustainable Behavior*) were more neutral (3.85, 4.75, and 4.60, respectively), and the lowest of all variable mean scores studied. The results related to sustainable apparel behavior are in line with those of Gwozdz et al. (2017) who found relatively low mean scores for environmental apparel consumption, including that participants engaged rarely or sometimes in behaviors such as purchasing clothes with environmentally friendly labelling, purchasing clothes made from organic fibers, or purposefully select fabrics that require cooler washing, shorter drying or less ironing. This could be in part due to the possibility that consumers do not always seek product information such as fiber content or care instructions; although Hyllegard et al. (2017) found that approximately 60% of young apparel consumers read hang-tag information frequently or very frequently, they were seeking more often brand identification information than fiber or care information, and that these results differed significantly based on gender. Additional sustainable apparel consumption research has suggested clothing consumers that are aware of negative environmental impacts of apparel purchases purposefully distance themselves from the potential negative outcomes of their consumption (Diddi et al., 2019) or simply do not associate their apparel consumption behavior (e.g., overconsumption) with sustainability issues (Harris, Roby & Dibb, 2016). It is interesting to note that the range of results for *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience* were narrower than the other variables of interest with the lowest recorded composite score for *motivations* of 2.89 and for *satisfaction* 2.33, while all other variables recorded the full 7-point range. See *Table 13*.

Table 15. Descriptive Means for Participants on Key Variables of Interest (n=318)

	Mean	Minimum	Maximum	Std. Error	Std. Deviation	Variance
<i>Motivations for MCA purchase (9 items)</i>	5.61	2.89	7.00	.05	.95	.90
<i>Satisfaction with MCA product and experience (6 items)</i>	5.73	2.33	7.00	.06	.97	.95
<i>Emotional Product Attachment (5 items)</i>	5.16	1.00	7.00	.07	1.22	1.49
<i>Environmental Attitudes (5 items)</i>	5.43	1.00	7.00	.07	1.32	1.75
<i>SAB 1 Pre-Purchase Behaviors (6 items)</i>	3.85	1.00	7.00	.08	1.37	1.89
<i>SAB 2 Post-Purchase Behaviors (5 items)</i>	4.75	1.00	7.00	.07	1.25	1.56
<i>General Sustainable Behaviors (6 items)</i>	4.60	1.00	7.00	.07	1.21	1.46

Cluster Analysis for Research Question One

The objective of this thesis was to explore MCA consumer segments in order to understand motivations and satisfaction regarding their MCA purchases, and furthermore aimed to examine whether and how MCA consumers might display sustainability-related variables (i.e., emotional product attachment, environmental attitudes) and behaviors. A market segmentation framework was proposed to meet this objective because previous literature has not studied the MCA consumer population. Cluster analysis (segmentation) enabled the inclusion of multiple variables allowing both research questions to be addressed by building robust consumer profiles that consider the MCA-related purchase patterns and characteristics, as well as sustainability-related variables and behaviors.

Hierarchical cluster analysis. Hierarchical cluster analysis was conducted using the *IPP* interaction variable and *duration* variable as the basis of cluster formation, and clusters were calculated using Ward’s method and squared Euclidean means. The agglomeration schedule (see Table 14) and dendrogram (see Appendix E) both suggested a two-cluster solution as the best outcome. In determining how many clusters should be considered for the final analysis, the

agglomeration schedule and dendrogram could perhaps indicate a higher number of clusters; however, in analyzing these cluster results, it was shown in multiple iterations that there were two main clusters, and while additional smaller clusters could be formed, the additional clusters were composed of too few cases to provide reliable results. Additionally, in considering the proposed segmentation framework, an eight-cluster solution was tested; excluding the clusters with less than 10 cases resulted in four usable clusters that were analyzed using a t-test comparison of means. Results of this analysis did not yield significant findings to suggest the use of eight-cluster solution would be more reliable or accurate than the two-cluster solution.

Table 16. Ward's Method Hierarchical Cluster Analysis, partial Agglomeration Schedule

<i>Agglomeration Schedule</i>						
<i>Stage</i>	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
<i>1</i>	313	319	0.000	0	0	4
<i>[...]</i>						
<i>308</i>	81	106	179.43	307	299	313
<i>309</i>	8	10	209.53	303	302	314
<i>310</i>	2	7	242.48	306	305	312
<i>311</i>	3	155	282.98	0	0	314
<i>312</i>	2	5	363.08	310	301	316
<i>313</i>	81	82	467.12	308	304	315
<i>314</i>	3	8	609.47	311	309	316
<i>315</i>	81	83	782.82	313	293	317
<i>316</i>	2	3	1125.02	312	314	317
<i>317</i>	2	81	3881.92	316	315	0

Confirmatory k-means cluster analysis. To confirm the two-cluster solution, a *k*-means cluster analysis was conducted; two cluster groups were identified and saved for further analysis. Final cluster centers identified the two groups as differing most drastically regarding how long consumers have been purchasing customized apparel products. Cluster one was centered around

2.2 years for *duration of MCA purchase behavior* and 1.29 *IPP*, while cluster two was centered around 9.2 years of *duration of MCA purchase behavior* and 1.49 *IPP*, see Table 15.

Table 17. Final cluster centers from k-means cluster analysis

Final Cluster Centers		
	Cluster	
	1	2
<i>Duration of MCA Purchase Behavior</i>	2.2	9.2
<i>Items per Purchase (Amount/Frequency)</i>	1.29	1.49

Reviewing the cluster centers (see Table 15) and additional cluster details, a distinction in the amount of experience between the two groups is apparent; cluster one included participants with up to five years of MCA purchase behaviors, while cluster two participants had six or more years of MCA purchase behaviors. As will be discussed subsequently, cluster two also reported higher average frequency and amount of MCA purchases and was therefore labeled “*experienced customizers*” while cluster one was named “*new customizers.*” Of note in describing the two clusters is the population distribution of the groups; 76.42% of participants were identified as belonging to the *new customizers* cluster (n = 243), while only 23.58% (n=75) of survey respondents fit parameters of the *experienced customizer* clusters. In considering the proposed segmentation model (see Figure 1, in Literature Review) and the final clustering basis, *Figure 10* was created to visualize the clusters in relation to the MCA purchase pattern variables.

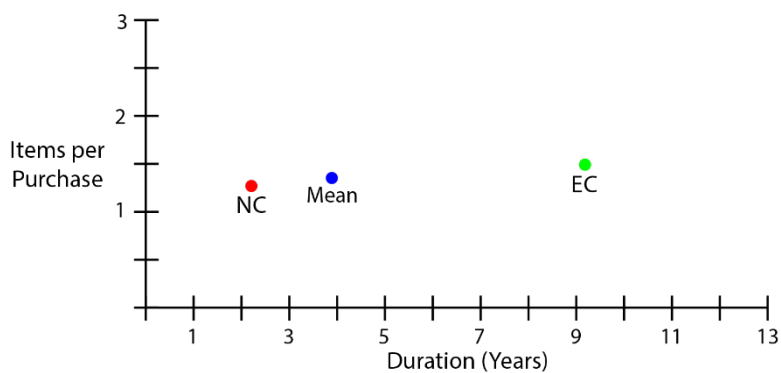


Figure 10. Cluster placement using final segmentation basis

Note 1. NC = New Customizers; EC = Experienced Customizers

Cluster Details and Comparisons

Analysis of the two clusters included calculating descriptive statistics (means) for the variables of interest and then executing t-test comparison of means to identify any significant differences between the clusters. Demographics of the clusters will be introduced before presenting findings of the comparison between the clusters.

Demographic profiles of the clusters. Making up 76.42% of the participants (n=243), cluster 1 (*new customizers*) had an average age of 33.51 years old, and a range of 20-80 years. Approximately 46.1% of *new customizers* reported obtaining a bachelor's degree as their highest level of *education*. Cluster 1 showed a higher proportion of men to women (56.4% to 42.8%, respectively), and included the only gender non-conforming respondents (n=2). Approximately 48.2% of the respondents reported *incomes* between \$20,000 and \$59,999. The average *BMI* for *new customizers* was 26.57, with an average reported height of 67.68" and average reported weight of 174.44lbs. Cluster two (n = 75; *experienced customizers*) had an average age of 32.41 years old, and a range of 22-55 years old. Approximately 41% of *experienced customizers* reported receiving a bachelor's degree as the highest level of *education*, with 18.7% reporting an associate degree (compared to 13.6% in cluster 1, and average of 14.8% for the whole group). The *income* of cluster 2 was skewed towards the lower end with 29.3% reporting an income of \$20,000-\$39,999 (compared to 23.9% in cluster 1). The average *BMI* of the *experienced customizers* was 27.00, with an average reported height of 67.48" and average reported weight of 174.79lbs. See Table 16 for demographic details of the clusters.

Table 18. Descriptive Statistics of Two Cluster Solutions; Demographics

Demographic Characteristics	Cluster 1 “New Customizers” (n=243)		Cluster 2 “Experienced Customizers” (n=75)	
	(n)	%	(n)	%
Age				
• Mean		33.51		32.41
• Range		20-80		22-55
Education				
• High School/GED	29	11.9%	9	12.0%
• Some college	47	19.3%	14	18.7%
• Associate’s	33	13.6%	14	18.7%
• Bachelor’s	112	46.1%	31	41.3%
• Master’s	19	7.8%	6	8.0%
• Doctoral	2	0.8%	0	0.0%
• Professional	1	0.4%	1	1.3%
Gender				
• Female	104	42.8%	36	48.0%
• Male	137	56.4%	39	52.0%
• Other	2	0.8%	0	0.0%
Income				
• Less than \$20,000	40	16.5%	9	12.0%
• \$20,000 - \$39,999	58	23.9%	22	29.3%
• \$40,000 - \$59,999	59	24.3%	16	21.3%
• \$60,000 - \$79,999	43	17.7%	15	20.0%
• \$80,000 - \$99,999	26	10.7%	8	10.7%
• \$100,000 - \$149,999	13	5.3%	5	6.7%
• \$150,000 - \$199,999	4	1.6%	0	0.0%
BMI Categories				
• Underweight	6	2.52%	1	1.37%
• Normal	104	43.70%	31	42.46%
• Overweight	73	30.67%	22	30.14%
• Obese	55	23.11%	19	26.03%
Mean BMI		26.57		27.00
• Mean Height, (in.)		67.68		67.48
• Mean Weight (lbs.)		174.44		174.79

MCA purchase patterns of new and experienced customizers. The *new customizers* purchased MCA an average of 4.06 times and purchased an average of 4.91 custom apparel products in the two-years prior to completing the survey, while *experienced customizers* purchased MCA an average of 5.15 times and purchased 7.37 items during the same two-year period. The key identifier between clusters was the average *duration* of the custom apparel purchasing behavior, *new customizers* had an average of 2.19 years of MCA purchase experience, while *experienced customizers* had an average of 9.20 years of experience. *New customizers* reported that MCA made up an average of 14.78% of their total wardrobe, while *experienced customizers* wardrobes were made of an average of 18.04% MCA. Independent samples t-test results showed significant differences between the clusters for the MCA purchase pattern variables: *frequency* of MCA purchases ($M_{NEW} = 4.06$ vs. $M_{EXPERIENCED} = 5.15$, $t = -2.17$, $p < 0.05$), *amount* of MCA purchases ($M_{NEW} = 4.91$ vs. $M_{EXPERIENCED} = 7.37$, $t = -2.69$, $p < 0.01$), and *duration* of MCA purchase behaviors ($M_{NEW} = 2.19$ vs. $M_{EXPERIENCED} = 9.20$, $t = -27.05$, $p < 0.001$). See *Table 17*.

Table 19. Independent samples t-test of participant clusters on MCA purchase patterns

Variable	M_{NEW}	$M_{EXPERIENCED}$	t
How many times have you purchased customized apparel products over the past two years? (Frequency)	4.06	5.15	-2.17*
How many customized apparel products have you purchased over the past two years? (Amount)	4.91	7.37	-2.69**
Items per purchase	1.29	1.49	-1.58
Years since first customized apparel purchase (Duration)	2.19	9.20	-27.05***
Approximately what percentage of your wardrobe is customized apparel products?	14.78	18.04	-1.44

Table Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Other variables of interest. Independent samples t-test analysis was conducted using the two clusters and all other variables of interest did not yield significant differences between the *new customizers* and *experienced customizers*, see *Table 18*. Cluster means for demographic

variables were nearly identical (*income*: $M_{NEW} = 3.05$ vs. $M_{EXPERIENCED} = 3.08$, $t = -0.16$, $p > 0.05$; *education*: $M_{NEW} = 4.23$ vs. $M_{EXPERIENCED} = 4.20$, $t = 0.16$, $p > 0.05$; and *BMI*: $M_{NEW} = 26.57$ vs. $M_{EXPERIENCED} = 27.00$, $t = -0.53$, $p > 0.05$), while MCA related characteristics (*motivations for MCA purchase*: $M_{NEW} = 5.58$ vs. $M_{EXPERIENCED} = 5.70$, $t = -0.94$, $p > 0.05$; and *satisfaction with the MCA product and customization experience*: $M_{NEW} = 5.69$ vs. $M_{EXPERIENCED} = 5.88$, $t = -1.63$, $p > 0.05$) and sustainability related variables (*emotional product attachment*: $M_{NEW} = 5.16$ vs. $M_{EXPERIENCED} = 5.15$, $t = 0.10$, $p > 0.05$; and *environmental attitude*: $M_{NEW} = 5.38$ vs. $M_{EXPERIENCED} = 5.58$, $t = -1.18$, $p > 0.05$; *SAB1 Pre-purchase behaviors*: $M_{NEW} = 3.82$ vs. $M_{EXPERIENCED} = 3.92$, $t = -0.52$, $p > 0.05$; *SAB2 Post-purchase behaviors*: $M_{NEW} = 4.72$ vs. $M_{EXPERIENCED} = 4.98$, $t = -1.54$, $p > 0.05$; *general sustainable behaviors*: $M_{NEW} = 4.58$ vs. $M_{EXPERIENCED} = 4.67$, $t = -0.61$, $p > 0.05$) also showed little differences between the clusters. Noteworthy perhaps was that cluster means of the *experienced customizers* were higher for all variables, except *education* and *emotional product attachment*, both of which had nearly equal values between the clusters.

Table 20. Independent samples t-test of participant clusters on key variables of interest

Variable	M_{NEW}	$M_{EXPERIENCED}$	t
Your income ¹	3.05	3.08	-0.16
Your education ¹	4.23	4.20	0.16
Body Mass Index (BMI)	26.57	27.00	-0.53
Motivation for MCA Purchase (9 items)	5.58	5.70	-0.94
Satisfaction with the MCA product and customization experience (6 items)	5.69	5.88	-1.63
Emotional Product Attachment (5 items)	5.16	5.15	0.10
Environmental Attitude (5 items)	5.38	5.58	-1.18
SAB1: Pre-Purchase Behaviors (6 items)	3.82	3.92	-0.52
SAB2: Post-Purchase Behaviors (4 items)	4.70	4.88	-1.11
General Sustainable Behavior (6 items)	4.58	4.67	-0.61

Table Note. ¹. categorical variables coded from 1-9 (income), and 1-8 (education); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Supplemental independent t-tests were conducted on additional individual items from the survey, including product longevity intentions, overall percentage of custom apparel in wardrobes, general apparel spending habits, other demographics (i.e., age and gender). See Table 19. Results showed significant differences between the clusters for product longevity intentions ($M_{\text{NEW}} = 5.58$ vs. $M_{\text{EXPERIENCED}} = 6.58$, $t = -2.47$, $p < 0.05$), and average number of apparel items (MCA and non-MCA) purchased over a 6-month period ($M_{\text{NEW}} = 8.53$ vs. $M_{\text{EXPERIENCED}} = 12.75$, $t = -2.61$, $p < 0.05$). Other tested variables did not reveal significant differences between the clusters. For full results, see Table 19.

Table 21. Independent samples t-test of clusters and additional variables of interest

Variable	M_{NEW}	$M_{\text{EXPERIENCED}}$	t
How long do you intend to keep your customized apparel products?	5.58	6.58	-2.47*
Age	33.51	32.41	1.14
Gender ¹	1.58	1.52	0.90
6-month average spending on apparel generally (\$)	401.28	437.47	-0.43
6-month average apparel items bought	8.53	12.75	-2.61*

Table Note. ¹. gender coded as 1=female, 2=male, 3=other; * $p < 0.05$.

Although results indicated that *experienced customizers* were more likely to purchase more apparel items in a six-month period ($M_{\text{NEW}} = 8.53$; $M_{\text{EXPERIENCED}} = 12.75$), the results also showed that *experienced customizers* were more likely to keep their customized products longer than the *new customizers* ($M_{\text{NEW}} = 5.58$ years vs. $M_{\text{EXPERIENCED}} = 6.58$ years). See Figures 11 and 12. Furthermore, both clusters reported general agreement with the individual *emotional product attachment* item “I will keep my customized apparel products longer than apparel that was already made when I bought it” ($M_{\text{NEW}} = 5.49$ vs. $M_{\text{EXPERIENCED}} = 5.40$; 7-pt Likert type 1 = strongly disagree, 4 = neutral, 7 = strongly agree).

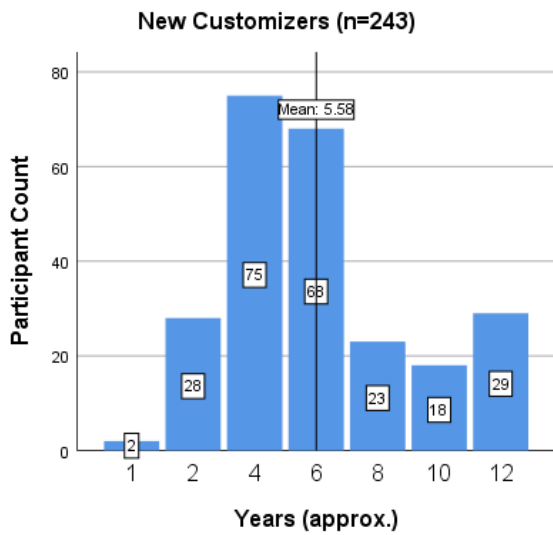


Figure 11. Cluster One: Intention to keep MCA products, (n=243)

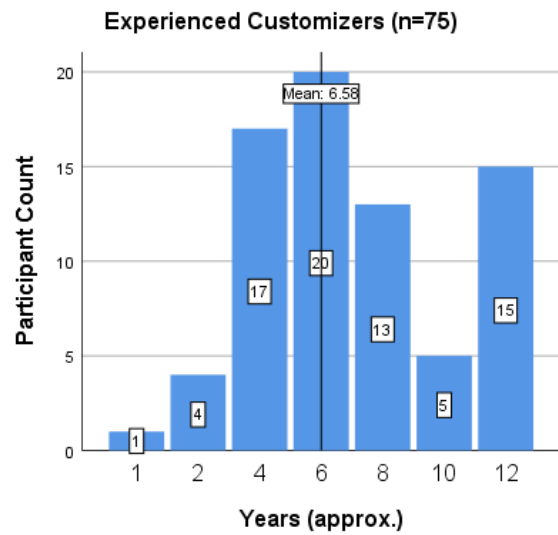


Figure 12. Cluster Two: Intention to keep MCA products, (n=75)

Analysis for Research Question Two

The second research question (RQ2) guiding this thesis asks to what extent sustainability-related variables and sustainable consumer behaviors are displayed by current MCA consumers and how they may influence MCA purchase patterns and characteristics. In order to address this question, multiple regression and correlation analyses were conducted based on the results of the descriptive and cluster analyses to further develop our understanding of the relationships between participants' purchase behaviors and characteristics, and their sustainability-related variables and behaviors. Finding of multiple regression analyses and correlation results will be discussed in the following sections.

Multiple regression. Multiple regression analyses were conducted to determine how sustainability-related variables may influence MCA purchase patterns (i.e., frequency, amount, duration) and characteristics (i.e., motivations and satisfaction). Five sets of multiple regression analyses were conducted to explore and understand the participants and their behaviors and characteristics as they relate to sustainability. First, three sets of multiple regression analysis

were conducted using the sustainability-related variables (i.e., *emotional product attachment, environmental attitudes, and sustainable apparel behaviors (pre- and post-purchase) and general sustainable behaviors*) as the independent variables with the clustering variables (i.e., *frequency, amount, duration*) as dependent variables. Results of these analyses will be discussed further in the following paragraphs and full results are available in Tables 20-22. Additionally, two sets of multiple regression analysis were conducted to examine *motivations for MCA purchase and satisfaction with the MCA product and customization experience* as dependent variables, again with the sustainability-related variables as independent variables. Results of these analyses will be discussed subsequently with full results available in Tables 23 and 24.

Frequency as dependent variable. In the first regression model, *frequency* was entered as the dependent variable with the sustainability variables entered as the independent variables. The overall model was significant ($R^2 = .06, F = 3.85, p < .01$) and results indicated *environmental attitudes* negatively influenced *frequency of MCA purchases* and *SAB 1 Pre-Purchase Behaviors* positively influenced frequency of MCA purchases ($\beta = -0.17, t = -2.47, p < 0.05; \beta = 0.19, t = 2.33, p < 0.05, respectively$). However, *emotional product attachment, SAB 2 Post-Purchase Behaviors, and general sustainable behaviors* ($\beta = 0.06, t = 1.04, p > 0.05; \beta = -0.03, t = -0.32, p > 0.05; \beta = 0.07, t = 0.78, p > 0.05, respectively$) did not have significant results in this model. See Table 20.

Table 22. Multiple Regression Analysis Set One, Frequency as dependent variable.

	Df	R ²	F	β	t	Sig.
Dependent Variable: Frequency	5	0.06	3.85			.00***
Emotional Product Attachment				0.06	1.04	.30
Environmental Attitudes				-0.17	-2.47	.01**
SAB 1 Pre-Purchase Behaviors				0.19	2.33	.02*
SAB 2 Post-Purchase Behaviors				-0.03	-0.32	.75
General Sustainable Behaviors				0.07	0.78	.44

Table Note. *p<0.05, **p<0.01, ***p<0.001.

Amount as dependent variable. The second set of multiple regression analysis was conducted using the *amount* of MCA purchases as the dependent variable, keeping the same sustainability variables entered as the independent variables. The overall model was not significant ($R^2 = .03$, $F = 1.93$, $p > .05$). Results further showed only *environmental attitudes* negatively influenced the amount of MCA purchases made by the participants ($\beta = -0.14$, $t = -2.01$, $p < 0.05$). The other sustainability-related variables did not have a significant relationship with the dependent variable in this model. See Table 21.

Table 23. Multiple Regression Analysis Set Two, Amount as Dependent Variable

	Df	R ²	F	β	t	Sig.
Dependent Variable: Amount	5	0.03	1.93			.09
Emotional Product Attachment				-0.00	-0.074	.94
Environmental Attitudes				-0.14	-2.01	.05*
SAB 1 Pre-Purchase Behaviors				0.11	1.38	.17
SAB 2 Post-Purchase Behaviors				-0.03	-0.45	.65
General Sustainable Behaviors				0.10	1.13	.23

Table Note2. *p<0.05

Duration as dependent variable. A third set of multiple regression analysis was conducted with *duration* entered as the dependent variable and the sustainability variables entered as the independent variables. The overall model was not significant ($R^2 = .01$, $F = 0.79$, $p > .05$) and results indicated none of the sustainability-related variables had a significant relationship with the dependent variable in this model. See Table 22.

Table 24. Multiple Regression Analysis Set Three, Duration as Dependent Variable.

	Df	R ²	F	β	t	Sig.
Dependent Variable: Duration	5	0.01	0.79			.56
Emotional Product Attachment				-0.02	-0.29	.77
Environmental Attitudes				0.07	0.99	.32
SAB 1 Pre-Purchase Behaviors				0.10	1.24	.22
SAB 2 Post-Purchase Behaviors				0.02	0.22	.83
General Sustainable Behaviors				-0.04	-0.42	.67

Motivation as dependent variable. The fourth set of multiple regression was conducted with *motivations for MCA purchase* entered as the dependent variable with the same sustainability variables of previous models entered as the independent variables. The overall model was significant ($R^2 = .40$, $F= 37.86$, $p < .01$) and results indicated *emotional product attachment* and *environmental attitudes* positively influenced *motivations for MCA purchase* ($\beta = 0.55$, $t = 11.33$, $p < 0.01$; $\beta = 0.25$, $t = 4.45$, $p < 0.01$, respectively). However, *SAB1 pre-purchase behaviors*, *SAB 2 post-purchase behaviors*, and *general sustainable behaviors* ($\beta = -0.11$, $t = -1.68$, $p > 0.05$; $\beta = 0.00$, $t = -0.02$, $p > 0.05$; $\beta = 0.05$, $t = 0.61$, $p > 0.05$, respectively) did not have significant relationships with the dependent variable in this model. See Table 23.

Table 25. Multiple Regression Analysis Set Four, Motivation as Dependent Variable

	Df	R ²	F	β	t	Sig.
Dependent Variable: Motivation	5	0.40	37.86			.00***
Emotional Product Attachment				.55	11.33	.00***
Environmental Attitudes				.25	4.45	.00***
SAB 1 Pre-Purchase Behaviors				-.11	-1.68	.09
SAB 2 Post-Purchase Behaviors				.00	-.02	.99
General Sustainable Behaviors				.05	.61	.55

Table Note3. ***p<0.001.

Satisfaction as dependent variable. The fifth and final set of multiple regression was conducted with *satisfaction with the MCA product and customization experience* entered as the dependent variable and the five sustainability variables entered as the independent variables. The overall model was significant ($R^2 = .41$, $F= 40.19$, $p < .01$). Results indicated four of the five sustainability variables had significant relationships with the dependent variable. *Emotional product attachment*, *environmental attitudes*, and *SAB2 post-purchase behaviors* positively influenced *satisfaction with the MCA product and customization experience* ($\beta = 0.49$, $t = 10.18$, $p < 0.01$; $\beta = 0.27$, $t = 4.81$, $p < 0.01$; $\beta = 0.15$, $t = 2.50$, $p = 0.01$, respectively). *SAB1 pre-purchase behaviors* negatively influenced *satisfaction with the MCA product and customization*

experience ($\beta = -0.21, t = -3.38, p < 0.01$). GSBs was the only independent variable in the model that did not have a significant relationship with satisfaction ($\beta = 0.04, t = 0.55, p > 0.05$).

See Table 24.

Table 26. Multiple Regression Analysis Set Five, Satisfaction as Dependent Variable

	Df	R ²	F	β	t	Sig.
Dependent Variable: Satisfaction	5	0.41	40.19			.00***
Emotional Product Attachment				.49	10.18	.00***
Environmental Attitudes				.27	4.81	.00***
SAB 1 Pre-Purchase Behaviors				-.21	-3.38	.00***
SAB 2 Post-Purchase Behaviors				.15	2.50	.01**
General Sustainable Behaviors				.04	0.55	.59

Table Note. **p<0.01, ***p<0.001.

Ancillary Analyses

Given the exploratory nature of this preliminary research and due to lack of significant findings that resulted from cluster means comparisons, correlation analysis provided additional context by which to understand results of this research. Correlation analyses were conducted on the total sample population as well as separately for each cluster group; findings of all three correlations were examined and compared and key findings of these analyses are presented in the following sections. Full correlation table is presented in Appendix F.

Whole Sample Correlation. To further explore the variables of interest Pearson’s 2-tailed correlation analysis was conducted to look for other potential associations between participants and sustainable consumer behaviors. This analysis provides a framework to guide future studies on the topic of apparel customization and sustainable consumption and behaviors. Key findings from correlation analysis related to demographic variables will be described in the following section, for full correlation analysis results see Appendix C.

Demographic factors and sustainability-related variables. Demographic factors such as *income, education, and BMI* are considered to influence consumer purchase behaviors and

therefore correlation results examining these demographic factors in relation to sustainability-related variables will help to expand our understanding of the participants. As this analysis is somewhat out of the scope of the research objectives, only significant findings will be detailed in text. For full results see Table 25.

Table 27. Pearson correlation table, all participants, significant demographic variables.

<i>Variable¹</i>	<i>Freq.</i>	<i>Amt.</i>	<i>Dur.</i>	<i>Mot.</i>	<i>Sat.</i>	<i>EPA</i>	<i>EA</i>	<i>SAB1</i>	<i>SAB2</i>	<i>GSB</i>
<i>Education</i>	.10	.08	.09	.02	-.02	.03	.01	.14*	.00	.15**
<i>Income</i>	.13*	.10	.12*	.01	.06	.10	-.13*	.04	-.08	.05
<i>BMI</i>	-.03	-.06	.03	-.02	-.03	-.07	-.01	-.14*	-.15**	-.16**

Table Note. ¹. Freq. = Frequency of MCA purchase, Amt. = Amount of MCA items purchased, Dur. = Duration of MCA purchase behavior, Mot. = Motivations for MCA purchase, Sat. = Satisfaction with the MCA product and customization experience, EPA = emotional product attachment, EA = environmental attitude, SAB1 = Pre-purchase sustainable apparel behaviors, SAB2 = Post-purchase sustainable apparel behaviors, GSB = General sustainable behaviors, BMI = Body mass index; *p<0.05, **p<0.01 (2-tailed).

Results of correlation analysis showed that, among the participants who had MCA purchase experiences, *education* was positively associated with *SAB1 pre-purchase behaviors*, and *general sustainable behaviors* ($r = .14, < 0.05$; $r = .15, p < 0.01$, respectively), while *income* results showed a significant negative correlation with *environmental attitudes* ($r = -.13, p < 0.05$). No other significant correlations were found between *education* or *income* and other sustainability-related variables. Previous research has considered *BMI* and/or body shape as a potential driver of MCA purchase intention, but no previous research in MCA has considered *BMI* as it relates to sustainable consumer variables or behaviors. Results from this research revealed *BMI* was negatively associated with both sustainable apparel behaviors, both *pre-purchase* and *post-purchase*, as well as *general sustainable behaviors* ($r = -.14, p < 0.05$; $r = -.15, p < 0.05$; $r = -.16, p < 0.05$, respectively). However, there were no significant correlations seen between *BMI* and *EPA* or *EA*. See Table 25.

Cluster correlation comparisons. With consideration of the segmentation framework presented in this thesis, correlation analysis using the variables of interest to this research was conducted on *new* and *experienced customizers* separately in order to further enhance our understanding of the resultant segments and the emerging MCA consumer market. Comparing the correlations analysis of the two segments revealed more significant correlations for *new customizers* than the *experienced customizers*, with notable differences between the clusters relating to the variables of *duration of MCA purchase behavior*, *income*, *education*, *BMI*, *SAB1 pre-purchase behaviors*, and *general sustainable behaviors*. Noteworthy differences will be highlighted here in order of the variable groups (i.e., MCA purchase patterns, demographics, MCA-specific characteristics, and sustainability-related variables).

MCA purchase patterns. Interestingly, correlation analysis of the individual MCA consumer segments indicated that *duration of MCA purchase behavior* was significantly and positively correlated with *frequency of MCA purchase*, and *amount of MCA purchases* for the *new customizers* only ($r = .38$ and $r = .35$, respectively, both at $p < 0.01$); *duration of MCA purchase behavior* was not found to be significantly correlated to *frequency* or *amount* for *experienced customizers* ($r = .05$ and $r = .06$, respectively, $p > 0.05$). *Frequency of MCA purchases* and *amount of MCA purchases* had significant positive correlations for both clusters, but the strength of the relationships was stronger for *new customizers* ($r = .72$, $p < 0.01$) than for *experience customizers* ($r = .45$, $p < 0.01$).

Demographics. Demographic variables displayed an array of correlations for *new customizers* that were not exhibited in the *experienced customizer* cluster. *Education* had significant positive correlations among the *new customizers* for the variables of *duration* ($r = .22$, $p < 0.01$), *SAB1 pre-purchase behaviors* ($r = .19$, $p < 0.01$), and *general sustainable behaviors*

(.15, $p < 0.05$); these correlations for experienced customizers were not significant ($r = .20$, $r = -.05$, and $r = .12$, respectively; $p > 0.05$). The *income* variable revealed differences between the clusters in correlation with the MCA purchase pattern variables (i.e., *frequency*, *amount*, and *duration*), as well as *emotional product attachment* and *environmental attitudes*. Again, most of the significant correlations were seen only in the *new customizers* cluster; significant positive correlations between *income* and all three MCA purchase patterns (*frequency*: $r = .19$, $p < 0.01$; *amount*: $r = .14$, $p < 0.05$; *duration*: $r = .21$, $p < 0.01$) and a significant negative correlation between *income* and *environmental attitudes* ($r = -.14$, $p < 0.05$) were not reflected in the *experienced customizer* cluster ($r = -.12$, $r = -.12$, $r = .13$, and $r = -.16$, respectively; $p > 0.05$). However, *experienced customizers* did have a significant positive correlation between *income* and *emotional product attachment* ($r = .24$, $p < 0.05$) that was not seen in the *new customizers* ($r = .05$, $p > 0.05$). *Income* had similar significant positive correlations with *education* for both *new customizers* ($r = .35$, $p < 0.01$) and *experienced customizers* ($r = .32$, $p < 0.01$). The BMI of *new customizer* had significant negative correlations with *SAB1 pre-purchase behaviors* ($r = -.16$, $p < 0.05$), *SAB2 post-purchase behaviors* ($r = -.19$, $p < 0.01$), *general sustainable behavior* ($r = -.19$, $p < 0.01$), and *education* ($r = -.13$, $p < 0.05$); again these correlations were not shared among the *experienced customizers* in regard to their BMI ($r = -.08$, $r = .08$, $r = -.08$, $r = -.05$, respectively; $p > 0.05$).

MCA-specific characteristics. Regarding the clusters MCA-specific characteristics of *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience*, identical correlations between *motivations* and *satisfaction* were seen in both clusters ($r = .74$, $p < 0.01$); this was also the strongest correlation seen overall among all variables. Further, correlations for *motivations for MCA purchase* were similar for *new* and *experienced*

customizers relating to the variables of *emotional product attachment* ($r = .58$ and $r = .53$, respectively; $p < 0.01$) and *environmental attitudes* ($r = .36$, $p < 0.01$ for both clusters). *Satisfaction with the MCA product and customization experienced* yielded subtle differences between the clusters for the variables of *emotional product attachment* (*new*: $r = .59$, *experienced*: $r = .32$; both $p < 0.01$) and *environmental attitudes* (*new*: $r = .40$, *experienced*: $r = .50$; both $p < 0.01$). *Motivations for MCA purchase* exhibited significant positive correlations for *new customizers* in relation to sustainability behaviors that were not matched in the *experienced customizer* data; *SAB1 pre-purchase behaviors* (*new*: $r = .14$, $p < 0.05$; *experienced*: $r = .03$, $p > 0.05$), *SAB2 post-purchase behaviors* (*new*: $r = .22$, $p < 0.01$; *experienced*: $r = .23$, $p > 0.05$); and *general sustainable behaviors* (*new*: $r = .27$, $p < .01$; *experienced*: $r = .14$, $p > 0.05$).

Sustainability-related variables. Perhaps most notably, sustainability-related variables were found to have various significant positive correlations for the *new customizers*, which were not echoed in the *experienced customizer* cluster. *Emotional product attachment* had significant positive correlations with the aforementioned *motivations* and *satisfaction* for both clusters, but otherwise only showed significant positive correlations with *new customizers* for the variables of *environmental attitudes*, *SAB1*, *SAB2*, *GSB* ($r = .23$, $r = .27$, $r = .32$, and $r = .31$, respectively; all at $p < 0.01$); no significant correlations were seen for *experienced customizers* ($r = .10$, $r = .12$, $r = .05$, and $r = .10$, respectively; all at $p > 0.05$). *SAB1 pre-purchase behaviors* had significant positive correlations with the MCA purchase pattern variables for *new customizers* only—*frequency of MCA purchase* ($r = .22$, $p < 0.01$), *amount of MCA purchases* ($r = .16$, $p < 0.05$), and *duration of MCA purchase behavior* ($r = .15$, $p < .05$); there were no significant correlations for the *experienced customizers* ($r = .10$, $r = -.10$, $r = -.01$, respectively; $p > 0.05$). Finally, *general sustainable behaviors* were significantly and positively correlated with *satisfaction with*

the MCA product and customization experience for new customizers ($r = .28, p < 0.01$); a correlation that was again not paralleled in the *experienced customizers* data ($r = .17, p > 0.05$). Neither cluster had significant correlations between *satisfaction* and *SAB1 pre-purchase behaviors* (supporting regression findings). See *Table 26* for full correlation details.

Table 28. Pearson (2-tailed) correlation table comparison of clusters, variables of interest.

Variable ¹	Cluster ²	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Freq.	NC	-												
	EC	-												
2. Amt.	NC	.72**	-											
	EC	.45**	-											
3. Dur.	NC	.38**	.35**	-										
	EC	.05	.06	-										
4. Mot.	NC	.04	.09	.06	-									
	EC	-.10	-.05	.05	-									
5. Sat.	NC	-.07	-.04	-.05	.74**	-								
	EC	-.18	-.19	.16	.74**	-								
6. EPA	NC	.13	.07	-.01	.58**	.59**	-							
	EC	-.07	-.16	.07	.53**	.32**	-							
7. EA	NC	-.08	-.09	-.08	.36**	.40**	.23**	-						
	EC	-.23	-.21	.16	.36**	.50**	.10	-						
8. SAB1	NC	.22**	.16*	.15*	.14*	.09	.27**	.23**	-					
	EC	.10	-.10	-.01	.03	-.06	.12	.27*	-					
9. SAB2	NC	.05	.01	.07	.22**	.32**	.32**	.41**	.50**	-				
	EC	-.01	-.09	-.05	.23	.35**	.05	.55**	.52**	-				
10. GSB	NC	.11	.08	.09	.27**	.28**	.31**	.52**	.68**	.61**	-			
	EC	.03	.02	.05	.14	.17	.10	.54**	.62**	.56**	-			
11. Edu.	NC	.09	.09	.22**	.05	-.02	.04	-.01	.19**	-.01	.15*	-		
	EC	.13	.07	.20	-.09	-.03	-.03	.08	-.05	-.01	.12	-		
12. \$/yr	NC	.19**	.14*	.21**	-.02	.03	.05	-.14*	.00	-.12	.02	.35**	-	
	EC	-.12	-.12	.13	.09	.18	.24*	-.16	.07	-.05	.11	.32**	-	
13. BMI	NC	-.02	-.07	-.07	-.03	-.06	-.08	-.02	-.16*	-.19**	-.19**	-.13*	-.10	-
	EC	-.09	-.06	.15	.01	.04	-.05	.00	-.08	.08	-.08	-.05	-.01	-

Note 4. **Bold** = significant correlations referenced in text;

¹. Freq. = Frequency of MCA purchase, Amt. = Amount of MCA items purchased, Dur. = Duration of MCA purchase behavior, Mot. = Motivations for MCA purchase, Sat. = Satisfaction with the MCA product and customization experience, EPA = emotional product attachment, EA = environmental attitude, SAB1 = Pre-purchase sustainable apparel behaviors, SAB2 = Post-purchase sustainable apparel behaviors, GSB = General sustainable behaviors, Edu. = Education level, \$/yr = Income, BMI = Body mass index; 2. NC = New customizers, EC = Experienced customizer; * $p < 0.05$, ** $p < 0.01$ (2-tailed).

CHAPTER V – DISCUSSION

Although the online apparel mass customization market has been in existence for close to twenty years, only one previous study has put the existing consumer in the spotlight (Larsson, 2012). Mass customization is considered by some to be a more sustainable alternative to the current dominate production method, mass-production (Boër et al., 2018; Lehmann et al., 2018; Nayak et al., 2015). The purpose of this thesis was to explore the current MCA consumer market from a sustainability perspective using a segmentation framework. Two distinct clusters were formed using participants' previous MCA purchase patterns, specifically how long they have been MCA consumers and the numbers of items per purchase. Results showed that *experienced customizers* purchased more MCA items more frequently and intended to keep them a year longer than *new customizers*. Both *new* and *experienced customizers* reported generally strong *emotional product attachment* towards their MCA products, and displayed high levels of *satisfaction with the MCA product and customization experience*; high satisfaction was found to be related to *motivations for MCA purchase* as well as sustainability-related variables, including *emotional product attachment*, and *SABI pre-purchase behaviors*.

In this chapter, findings of the research will be discussed in order as they relate to the research questions. First, clusters details will be discussed along with a review of demographic and MCA-related characteristics of participant clusters. Second, an evaluation of sustainability-related variables will be discussed as they relate to the clusters and findings from regression analyses linking MCA purchase patterns and characteristics to sustainability variables studied.

Research Question One

This thesis is (to the researcher's knowledge) the first to empirically examine existing MCA consumers in the USA, therefore the first question guiding this research one was interested

in identifying the *motivations for MCA purchase, satisfaction with the MCA product and customization experience*, and demographics (i.e., *income, education, body shape/BMI*) of contemporary MCA consumers using a segmentation framework based on MCA purchase patterns. This discussion will also reference qualitative data (i.e., participant responses for reason why they purchase MCA) and correlation analysis where relevant and appropriate.

Findings of the study suggested that the average participant was 33 years old, held a bachelor's degree, earned an annual income of around \$50,000, and was on the lower end of the "overweight" categorization for BMI (Center for Disease Control, 2017). The income and BMI of the participants are lower than national figures. See Limitations section in Chapter VI for more. On average, participants purchased from an MCA retailer once every six-months, and purchased one MCA item per shopping experience, with general apparel expenditures indicating an average of \$43 per apparel items purchased generally. The average duration of participants' experience as an MCA consumer was just under four years; cluster analysis showed two distinct clusters established using *duration of MCA purchase behavior* and *items per purchase* as bases. *New customizers* had significantly less frequent MCA purchase experiences, as well as significantly fewer amount of MCA items purchased compared to the *experienced customizers*, even though the items per purchase variable was not found to be significantly different between the clusters. *Experienced customizers* not only reported higher levels of MCA purchases, but also indicated higher overall apparel expenditure as well as significantly more apparel items bought generally than *new customizers*. The increased consumption of the *experienced customizers* could speak to a heightened fashion interest, something not examined within the scope of the present study, but which previous research has suggested leads to increased

consumption (Weber et al., 2017), as well as openness to trying alternative consumption channels such as MCA itself (Larsson, 2012; Ulrich et al., 2003).

Cluster details. Cluster 1 (*new customizers*) was composed of 243 participants who had up to five years of MCA purchase experience; they purchased MCA (on average) four times in the two years prior to survey completion, purchasing an average of five MCA items. Cluster 2 (*experienced customizers*) was composed of 75 participants who had between six and 15 years of MCA purchase experience; they purchased MCA five times in the two years prior to survey completion, purchasing an average of seven MCA items. Although, *experienced customizers* had significantly higher means for *frequency of MCA purchases* and *amount of MCA items purchased* than *new customizers*, they purchased about the same *items per purchase*, and there was little difference between the clusters in their demographic profiles. Further, there was little contrast between the clusters on any of the variables of interest related to MCA and/or sustainability. The lack of other significant differences could be due to the unequal sample sizes of the clusters (i.e., given the drastically smaller *experienced customizer* cluster means may shift more dramatically based on the responses of a small number of respondents).

Prior to body scanning and digital printing technologies, mass customization was limited by issues of garment fit and fabric/color selection (Fralix, 2001). This is evidenced in early leaders in MCA such as 4imprint and Underground Printing that operated as a catalog-based (4imprint, n.d.) or in-person MCA retailers (Underground Printing, n.d.) specializing surface application customizations (e.g., screen printing, embroidery) prior to moving to online platforms in the early 2000s (R. Makuch, personal communication, June 26, 2020). Given that *experienced customizers* captured by the current sample population have MCA purchase experience spanning up to 15 years would suggest that they are among the “innovators” and/or

“early adopters” identified in the diffusion of innovation framework, while the three-times larger cluster of *new customizers* would suggest MCA is still in the “early adopters” (or just entering the “early majority”) stage of diffusion (Rogers, 2003). From this perspective, it is perhaps unsurprising that there was a general homogeneity between the two clusters as previous research has suggested consumers in the same adoption categories may share the same characteristics, (e.g., fashion interest) while early and late adopters are more likely to have different characteristics (LaMorte, 2019).

Demographics. Demographic characteristics of interest to the present research (i.e., *income, education, and body type/BMI*) showed similar distribution of participants between the clusters, which could explain the limited significant findings between the clusters. However, based on the literature review, a few relationships between demographic characteristics and MCA purchase patterns were expected and will be discussed subsequently.

Apparel consumption research has suggested higher income US clothing consumers purchased more clothing than lower income consumers (Lang et al., 2013). Consistent with previous literature, results showed significant positive correlations between *income* and *frequency of MCA purchase*. There was also a significant positive correlation between *income* and *duration of MCA purchase behavior*, which is an interesting finding considering there was not a significant difference between the clusters related to income. Additionally, in the individual cluster correlation analysis, these significant relationships were only present in the *new customizers* cluster, which also had a significant positive correlation between *income* and *amount of MCA purchases*. These findings could indicate that price is considered a barrier to entry for new MCA consumers; individuals with more disposable income were more likely to make an MCA purchase earlier than lower income individuals. Previous research has found

consumers were generally willing to pay a price premium for customized products (e.g., Hawa, 2018; Schreier, 2006), however this research expands on previous literature by differentiating willingness to pay and the actual purchase behavior, which is moderated by the individual's income (e.g., the ability to actually afford the price-premium).

Also, worth considering in this discussion is the non-significant results seen among *experienced customizers* in regard to their MCA purchase patterns and *income*; in fact, self-reported spending figures showed that *experienced customizers* actually spent less money per garment than *new customizers*. However, *experienced customizers' income* was also significantly and positively correlated with *emotional product attachment*, suggesting that for *experienced customizers*, *emotional product attachment* may be influenced by their ability to afford all of the desired customizations (some, but not all MCA retailers' prices fluctuate per customization). Previous research has suggested higher income levels are more likely to engage in sustainable apparel behaviors (Austgulen, 2016); given the correlation between *income* and *frequency of MCA purchase*, and the result that both clusters agreed that they would keep MCA items longer than apparel that was already made when they bought it might suggest that participants view MCA as a more sustainable option when shopping for apparel.

Previous MCA research has not examined education levels due largely to the student populations sampled by much of the existing literature. Higher education levels have been suggested to increase environmental attitudes (Dunlap et al., 2000) and online purchase behaviors (Li et al., 1999). Based on the literature review, it was expected that higher education levels in this study may show a connection with the MCA purchase patterns (i.e., *frequency of MCA purchase, amount, of MCA purchases, and duration of MCA purchase behavior*). Unfortunately, findings from this research did not reveal significant differences between the

clusters relating to education. Additionally, correlation analysis did not show significant associations between education and the MCA purchase pattern variables. Li et al. (1999) conducted their research twenty years ago; therefore, it is possible that role of education is no longer as significant in predicting Internet usage in the United States, especially given that using technologies such as the Internet has become an essential skill for students beginning in K-12 education, with an entire field of research now devoted to teaching technology to students (Lai & Bower, 2020). It is also worth noting that the participant population was largely college-educated (45% had a Bachelor's degree), which given previous literature would indicate higher levels of environmental awareness and internet fluency generally, so the lack of significant findings related to education could be due to the homogeneous sample population.

Previous MCA research has indicated that consumers with more diverse body shapes and sizes may be an ideal target market for customization (Hawa, 2018; Larsson, 2012) suggesting that they may have more frequent MCA purchase patterns or have a longer duration of experience with MCA. However, contrary to expectations, cluster comparison and correlation results did not show significant associations between BMI and the MCA-related variables (i.e., frequency, amount, duration). These BMI findings are at odds with previous research that suggests MCA as a beneficial market for consumers with diverse body shapes (e.g., Hawa, 2018; Larsson, 2012). However, this thesis only examined BMI as a measure of body shape; other body metric indicators such as “typical” or “nontypical” body types (Hawa, 2018; Larsson, 2012) might play a role in determining consumer interest in purchasing MCA products.

Motivations and satisfaction. Except for Larsson's (2012) consumer perspective case study of a Swedish custom knitwear retailer, to the researchers' knowledge, no other research has examined the *motivations for MCA purchase* of existing MCA consumers, and the previous

research did not specifically question motivations identified in previous research (e.g., desire for uniqueness, creative achievement, functional benefits), but was more generally interested in crucial factors influencing MCA consumers' experience. On average, both clusters related positively to the scale items intended to measure participants' *motivations for MCA purchase* as well as their *satisfaction with the MCA product and customization experience*. Even though the results of cluster comparison were not significantly different between the *new* and *experienced customizers*, there was a pattern in the quantitative data to suggest that *experienced customizers* were more motivated than *new customizers* to make MCA purchases due to the unique, creative, and functional aspects of MCA products, which mirrors previous literature that has suggested consumers are motivated to purchase customized products for a variety of reasons, including a desire for uniqueness (e.g., Kang & Kim, 2012; Michel et al., 2009; Seo & Lang, 2018), creative achievement (e.g., Schreier, 2006; Trentin et al., 2014), and functional needs/utilitarian benefits (e.g., Merle et al., 2010; Wan et al., 2017). Qualitative data enriched the quantitative assessment of positive strong *motivations for MCA purchase*. Individual participant responses provided support for the previously identified desire for uniqueness, creative achievement and functional benefits of MCA products. Remarkably, and consistent with Larsson's (2012) elements of satisfaction with the product itself (i.e., product quality, fit) and satisfaction with the customer service experience were cited repeatedly, with quality being the most mentioned reason for MCA purchase. That satisfaction with the product quality appears to motivate repeat MCA purchases is revelatory finding as, apart from Larsson (2012), previous studies have not considered the product itself as being key to (repeat) purchase (intention) of MCA.

The findings of this research related to *satisfaction with the MCA product and customization experience* mirror that of Larsson (2012)—although they did not directly address

satisfaction in qualitative interviews, the author found quality, fit, and the aesthetic of the garment were related to long-term satisfaction (Larsson, 2012). Both quantitative and qualitative findings of this thesis indicated satisfaction with the process, product, and customer service experience influenced participants' motivations and re-purchase intentions. Additionally, there is a tendency from the results to show *experienced customizers* reported higher levels of *satisfaction with the MCA product and customization experience* on average than *new customizers* indicating a potential link between MCA consumers' purchase experience (*duration*) and *satisfaction*. This findings are consistent with previous literature in apparel and online-apparel purchases generally that have pointed to the interconnectedness of satisfaction, repeat purchase (intention), brand loyalty, and word-of mouth behavior within those contexts (Curtis, Abratt, Dion, & Rhoades, 2011; Kuo, Hu, Yang, 2013). There is perhaps evidence here to suggest a reinforcing positive relationship whereby an MCA consumer's initial *satisfaction with the MCA product and experience* is influenced by fun- and easy-to-use customization platform (e.g., Lee et al., 2011; Kamali & Loker, 2002; Ulrich et al., 2003), and then reinforced upon receipt of the high quality product (Larsson, 2012), which increases the likelihood of repeat purchase (intentions), brand loyalty and word-of-mouth behavior (Lee et al., 2011), which is likely to become stronger with increased purchase experiences (Kuo et al., 2013).

Findings of this research also indicate support for previous literature that have developed an early understanding the factors influencing satisfaction within the context of customization, including product utility (Mugge et al, 2010); the user's ability to effectively operate the customization configurator (Trentin et al, 2014), and the ability to achieve the desired outcome through the customization process (Kamali & Loker, 2002). Other results from this research that are consistent with previous literature include support ease of use of the customization platform

influencing customer satisfaction and purchase intention (de Bellis et al., 2019; Lee & Chang, 2011; Trentin et al., 2014). Four percent (n=27) of participants cited ease of use, or an easy to use platform as a reason for MCA purchases, indicating the MCA platform itself is an important factor influencing purchase behaviors. Also, the ability to customize or the flexibility of customization options was another commonly cited reason for purchase (13% of total mentions), which supports previous research that suggest the amount of customization features available is positively related to purchase intention and satisfaction with the customization process (Kamali & Loker, 2002).

Research Question Two

Research question two employed a sustainability lens to guide analysis of the established consumer segments as well as further explore the relationships between sustainability-related variables and MCA purchase patterns and characteristics using regression analysis. Sustainability-related variables were selected based on a review of previous sustainable (apparel) consumption research and include *emotional product attachment*, *environmental attitudes*, *sustainable apparel behaviors*, and *general sustainable behaviors*. Research question two asked to what extent these variables were displayed by MCA consumers and how they might influence consumers' MCA purchase patterns and characteristics. Discussion will be based on the segmentation framework of *new customizers* versus *experienced customizer* framework, along with significant correlation and regression analysis results.

Emotional product attachment. Previous literature has suggested that increasing *emotional product attachment* to apparel products may increase product longevity (e.g., Cho et al., 2015; Niinimäki & Hassi, 2011) and that MCA products in particular are predisposed to increased *emotional product attachment* due to the individual and self-expressive nature of the

customized product, and/or a feeling that the product is an extension of the self (Seo & Lang, 2019). Although, this thesis did not find significant differences between *new* and *experienced customizers* relating to their *emotional product attachment*, both groups displayed general positive/strong *emotional product attachment* regardless of how much experience a participant had with customization. Although both *new* and *experienced customizers* felt a connection to their MCA products equally and agreed that they planned to keep their MCA items longer than ready-made (mass-produced) products, *experienced customizers* expressed an intention to keep their MCA products on average a year longer than the *new customizers*. It has been suggested that extending the lifespan of apparel products by nine months reduces the carbon, water, and waste impacts by 20-30% (WRAP.org, 2015), so these findings are especially significant in considering the ecological impact of *experienced customizers* MCA consumption. Findings of the study also indicated a positive relationship between *duration of MCA purchase behavior* and MCA consumer's length of time they intend to keep the product. That *new customizers* expressed a very slightly stronger *emotional product attachment* compared to the *experienced customizers* could be a result of the novelty of their still nascent experience with customization, whereas *experienced customizers* are more likely to view the MCA experience as more normal, having completed the process more times.

Environmental attitudes. Cluster analysis results did not show a significant difference between the *new* and *experienced customizers* related to their *environmental attitudes* generally, but as noted for other variables, *experienced customizers* showed a general trend of more positive *environmental attitudes* compared to the *new customizers*. Regression results further indicated *environmental attitudes* negatively influenced both the *frequency* and *amount* of MCA purchases, meaning the MCA participants who were concerned about the environment and were

willing to reduce their consumption to help with the environment were likely to purchase fewer MCA items, less frequently. The finding seems consistent with previous research that has suggested positive *environmental attitudes* contribute to less materialistic values (Joung, 2013; Kilbourne & Pickett); a characteristic often associated with more sustainable consumer behaviors, such as reduced consumption (Joung, 2013). Additional regression analysis showed *environmental attitudes* positively influenced both *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience*. That is, MCA participants who believed humans are severely abusing the environment tended to report stronger positive *motivations for MCA purchase* and higher levels of *satisfaction with the MCA product and customization experience*.

Taken together, these regression results seem to be in conflict; on one hand, participants who reported positive *environmental attitudes* were more likely to have positive *motivations for MCA purchase* and *satisfaction with the MCA product and customization experience*; on the other hand, they were more likely to make fewer and less frequent MCA purchases. Previous research has suggested that positive *environmental attitudes* may influence consumers to purchase more sustainable products (e.g., Kang et al., 2013; Razzaq et al., 2018; Trivedi et al., 2018), and avoid overconsumption due to less materialistic values that result from the more positive *environmental attitudes* (Joung, 2013). Based on the findings of this research, it seems plausible that the participants of this study consider MCA products to be more sustainable than non-customized products readily available in the marketplace. Therefore, if the MCA product is viewed as a sustainable alternative by someone with a positive *environmental attitude*, they are likely to have strong *motivations for MCA purchase*; however, because of their *environmental attitudes* will consume less generally, including and pertaining to MCA purchases.

Sustainable consumer behaviors. This thesis was interested in examining the possibility that MCA consumers may engage in environmentally sustainable behaviors related to apparel, and more common sustainable behaviors. This research was guided by the assumption that, from a corporate perspective, MCA offers the ability to reduce textile waste through the made-to-order production model (see for example, Boër et al., 2018; Lehmann et al., 2018; Nayak et al., 2015); therefore, if the consumer of MCA is shown to have sustainable tendencies, it may indicate a relationship. Previous research in the field of MC and MCA have suggested consumers may be prone to longer product lifespans for customized products due to the increased *emotional product attachment* that results from the self-expressive product (e.g., Seo & Lang, 2019). However, to the researchers' knowledge, no previous research has considered sustainable consumer behaviors in the MCA context therefore presents a new perspective that merges the fields of sustainable consumer behaviors and mass customization for sustainable goals (especially related to apparel).

Previous literature has considered the different phases of sustainable apparel behaviors as pre-consumption (purchase decisions), post-consumption (maintenance and use behaviors), and divestment behaviors (e.g., Cho et al., 2015; Weber et al., 2017), results of factor analysis showed the survey instrument captured the purchase decisions and post-consumption phases of sustainable apparel behaviors. Although, cluster analysis did not reveal any significant differences between *new* and *experienced customizers* relating to their *sustainable apparel behaviors*, or *general sustainable behaviors*, there was a general trend in the data showing *experienced customizers* were more likely to report engaging in sustainable apparel behaviors, such as purchasing clothes made with recycled content and wearing second-hand or used clothing. However, although there was not a significant difference between clusters related to *MCA items per purchase*, *experienced customizers* had significantly higher amounts of

consumption for both MCA products over the previous two years, the overall number of apparel items they purchase on average in a six-month period. This admission seems to suggest that although there is a tendency in the data showing that *experienced customizers* are more likely to choose fabrics based on washing or drying temperatures, or repair and mend their clothes than *new customizers*, they may not associate the amount of MCA purchases and consumption with sustainable behaviors—something that all apparel retailers should address, as reducing consumption is the best way to practice responsible consumption (Harrabin, 2019).

An interesting result worthy of discussion is that mean scores for the sustainable consumer behavior variables were the lowest of all the key variables studied; *SAB1 pre-purchase behaviors* having the lowest overall mean score regardless of cluster. This was true for all six-items from the *pre-purchase behaviors* factor, with the item “I purposely select fabrics that require shorter drying time” receiving the lowest mean score of all survey items regardless of cluster. Mean scores for *SAB2 post-purchase behaviors* and *general sustainable behaviors* were higher than *pre-purchase behaviors*, but still indicative of only somewhat adoption of sustainable consumer behaviors generally. Of all the sustainable apparel behavior items “I donate clothes my clothes when I no longer use them” had the highest mean scores for both clusters. In regard to general sustainable behaviors, the item “I use products I have purchased for as long as possible” had the highest mean score, which was nearly identical between the groups. This item was removed during factor analysis as it was the only item to load on a second *GSB* factor. However, given that it speaks to product longevity, it is included here to aid the discussion. These findings seem to suggest that consumers are more familiar (or participate more) with sustainable use and/or disposal behaviors than they are (do) with sustainable (pre-)purchase behaviors.

Although cluster analysis did not reveal any significant differences between *new* and *experienced customizers* relating to their sustainable consumer behaviors, regression analysis did yield some significant and interesting findings. In regression analysis, *SAB1 pre-purchase behaviors* positively influenced the dependent variable of *frequency of MCA purchases*, meaning that when MCA participants of this study performed more sustainable apparel behavior such as buying clothing that is produced in an environmentally friendly manner, they were more likely to make frequent purchases of MCA products. The finding again reinforces the concept that consumers might view MCA as a more sustainable option. A more curious result was seen in regression analysis using *satisfaction with the MCA product and customization experience* as the dependent variable. *SAB1 pre-purchase behaviors* showed a significant negative relationship with *satisfaction with the MCA product and customization experience*, meaning that participants who reported purchasing apparel products made with organic materials or requiring cooler washing temperatures were less satisfied with their MCA products and experience. Within the same regression model, *SAB2 post-purchase behaviors* showed a significant positive relationship with *satisfaction*, meaning participants who reported donating old apparel were more satisfied with the MCA product and experience. This could suggest that participants who engage more frequently in sustainable apparel pre-purchase behaviors, do not see their needs (for organic, recycled, and/or environmentally friendly products) reflected in the product offerings, suggesting a need for greater transparency in MCA product details. For example, a search for the word “organic” on Underground Printing results in products that within the larger product descriptions generally do not detail any organic features (Underground Printing, n.d.b). However, given the majority of participants did report an intention to keep MCA products longer (than ready-made), indicates that MCA could be a more sustainable option for them.

CHAPTER VI – CONCLUSIONS

This research intended to address a gap in the literature on mass customization in the apparel industry. This study additionally presents a sustainability perspective for the consumer side of the MCA model in order to add to the growing fields of sustainable apparel consumption, and mass customization as a more sustainable production model. Conclusions are presented as theoretical implications, managerial recommendations, study limitations, and finally, directions to guide future research.

Theoretical Implications

The purpose of the study was to explore segments of the MCA consumer market and identify characteristics of existing MCA consumers as well as investigate potential associations between MCA consumers and sustainability-related variables. Through an online survey approach, quantitative and qualitative data provided better understanding of the contemporary MCA consumers. Specifically, there are three major theoretical contributions of the current study: the segmentation framework, the sustainability perspective, and the use of existing MCA consumers. These contributions will be discussed successively.

First, the segmentation framework used for this thesis expanded on previous MC segmentation studies which used motivational drivers of MC and/or MCA purchase intention for discerning clusters (Endo & Kincaide, 2008; Hawa, 2018; Michel et al., 2009). By presenting clusters based on actual MCA purchase patterns (i.e., *items per purchase, duration of MCA purchase behavior*), this segmentation basis found two clusters (*new customizers* and *experienced customizers*) which were used to develop profiles of actual MCA consumers in the United States and expand on existing knowledge based on previous studies uses of potential MCA consumers. Although this research found limited significant differences between the

clusters, segmentation using purchase behaviors proved useful for unpacking a multi-faceted market; one that the data would suggest is rapidly expanding. Findings of this study support the use of *duration of MCA purchase behavior* as a useful segmentation basis.

Second, this thesis employed a sustainability lens in order to extend MCA research by exploring the extent to which MCA consumers might display sustainability-related characteristics and behaviors. Additionally, the sustainability lens was included to examine how sustainability-related variables might be associated with MCA purchase patterns and characteristics. Using the segmentation framework, this thesis expands sustainable consumer research by providing a profile of MCA consumers related to their *emotional product attachment* and *environmental attitudes*, as well as *sustainable apparel behaviors* and *general sustainable behaviors*. Though not statistically significant, this thesis found a general trend suggesting that the duration of consumer's MCA purchase behavior may be related to enhanced sustainable consumer attitudes and behaviors (i.e., *environmental attitudes*, *sustainable apparel behaviors*, and *general sustainable behaviors*); however, further empirical examinations are needed to confirm such a relationship. This study expands on existing literature suggesting MCA could be a more sustainable alternative from a production perspective and provides further understanding of MCA and how it might relate to sustainability from a consumer perspective. These preliminary findings should be compared against a non-MCA consumer sample to consider if they are more sustainable in general, but from this research, there is evidence to suggest that MCA consumers display an emotionally bonded relationship with the MCA products they have purchase, and seem to consider MCA products more sustainable than ready-made apparel products in general. This sustainability perspective forms a base for future researchers to expand upon within the context of customization and apparel mass customization.

Third, this thesis was the first to sample US-based MCA consumers, expanding from the single previous study that sampled Swedish MCA consumers (Larsson, 2012). This thesis provides the largest known sampling of actual MCA consumers to date. Using the existing MCA consumer population in the United States, both quantitative and qualitative results of this research reinforce previous literature related to potential motivational drivers for MCA purchases (e.g., Fiore et al., 2004; Michel et al., 2009) and the factors that may influence consumer satisfaction with the MCA product and customization experience (e.g., Kamali & Loker, 2002; Trentin et al., 2014; Ulrich et al., 2003). Because previous research has been limited by the use of non-MCA consumers, this thesis also fills in gaps related to satisfaction with the MCA product itself and provides new aspects of the MCA product and experience that should be included in future MCA consumer studies.

Managerial Implications

Findings of this study also provide managerial implications for the apparel industry relating to mass customization and sustainability paradigms. First, this research supports previous literature that promotes MCA as an ecologically sustainable alternative to mass-production (e.g., Boër et al., 2018; Lehmann et al., 2018; Nayak et al., 2015) by adding a consumer perspective—results indicated that the relationship between MCA consumer and the MCA product enhances sustainable outcomes (i.e., increased product longevity). Retailers currently engaged in MCA may consider explicitly promoting other sustainable benefits of the MCA product (or production method) to further enhance the consumer-product relationship by better meeting consumers' sustainable behavior goals. Findings of this study suggest that non-MCA retailers may want to consider incorporating MCA options into their product offerings as part of larger sustainability goals and initiatives. Based on this research, it appears MCA offers

dual benefits of improving customer-brand and customer-product relationships through the *emotional product attachment* and enjoyable (satisfying) customization experience afforded by the MCA model. Additionally, the online customization platform provides a space to immerse the consumer in details related to sustainability and other transparency information giving the consumer the tools needed to make more informed decisions; perhaps these bits of information could replace the current images of add-on products meant to entice over-consumption. Based on the finding of this study, it is believed this enhanced transparency could have a positive effect on consumer satisfaction as well.

Second, this research provides retailers valuable insight about what MCA products are being purchased and why. Based on the findings current MCA retailers can further enrich the consumer-brand relationship by continuing to deliver high quality products and customer service and expand or improve the points of customization (customization options) available, such as size customizations. Non-MCA retailers can use findings such as top purchased MCA items to develop an advantageous entry point to customization within their organizations. Given the history of customized apparel, it is unsurprising that the two most cited products mentioned by participants were “shirts” and “t-shirts”—custom screen-printed t-shirts are at the roots of online clothing customization (e.g., CustomInk, 4Imprint, Underground Printing). Even looking at top-cited retailer Etsy today, a majority of sellers specialize in custom screen printing, embroidery, or other surface-level customizations. However, many other product categories (e.g. pants, dresses, jackets, etc.) were also purchased by participants, indicating consumers are eager to customize all manner of apparel products (and accessories such as hats and shoes). Although many of the top-cited MCA retailers customize pre-made t-shirts through post-production customizations (e.g., embroidery, screen-printing), traditional ready-to-wear labels should

consider how they may incorporate pre-production customization options (e.g. sizing, fit, style) into their perennial best-sellers or core products like t-shirts, thus offering a more inclusive and personal product that is less reliant on fit than more specialty products like dresses and jeans. As brands develop their MCA supply-chain frameworks, and with the continued improvement of new technologies like body scanners and virtual prototyping, brands and retailers can continue to expand MCA product offerings as part of a measured transition away from mass-production.

Third, this research highlights special relationship MCA consumers form with both the product and MCA retailer that should be considered as highly beneficial to retailers looking to build brand loyalty and ensure financially sustainable businesses. The customization experience itself was seen to be a key driver of MCA purchases, and previous research has noted that the online customization platform offers retailers a way to engage consumers outside of a physical retail environment, and incorporating such interactions may further enhance consumer relationships and increase customer satisfaction (Grosso et al., 2017). As consumers continue to take their purchases online, it will be increasingly important for all retailers to maintain (or expand) market share and relevance. Based on this study, it seems customization presents an opportunity for trusted retailers who already have loyal consumers to integrate customization as a beneficial change to the traditional customer-retailer relationship, without necessarily needing to market the shift as being related to sustainable corporate goals. While there were mentions of supporting small local brands or individual designers through customization purchases, no participants made specific mention of sustainable-aims in purchasing MCA. This seems to be the direction brands like Levi's and Nike have adopted. Nike, for example, continues to operate its ready-made business as it refines and improves its customization (or Nike by You) services

and programs, and makes no sustainability claims about their customized products; however, based on this study, perhaps they should start to consider the option.

MCA in the Post-COVID era. In light of COVID-19 and the era beyond, mass customization appears even more attractive than before; customization platforms offer an online experience that provides opportunities for social engagement (Grosso et al., 2017), which and can be stimulating and satisfying for the consumer (e.g., Franke & Schreier, 2010; Kamali & Loker, 2002; Wan et al., 2017) and through the online platform, lends itself to increased transparency and access to information regarding apparel products' environmental costs and/or benefits. Retailers must give consumers the tools to behave responsibly and then encourage good behaviors (e.g., reduced consumption, repairing and mending)—this requires a larger restructuring of the retailer-customer relationship, but this transition is possible with the mass customization model. Finally, although physical retail sales have been slowly shifting online for years (USCB, 2020), COVID-19 shuttering brick-and-mortar retailers will surely make this years' shift more dramatic, and retailers should use this opportunity to consider updating physical retail structures to support a mass customization systems of production and consumption by incorporating innovations like body scanning technologies and perhaps even micro-factories on-site.

Limitations & Future Research

This study analyzed self-reported survey data provided by 318 participants (MTurk workers) with previous MCA purchase experience. Although this study provides both theoretical and managerial implications, it is not without limitations and results should be viewed with consideration of the conditions that may affect generalizability. First, the pilot test of the survey should have been expanded to include a sample batch collection using MTurk in order to

identify potential screening questions and quality check barriers, missed in the initial pilot test that used known subjects who were not MTurk users. The use of MTurk also resulted in the need to conduct two batches of data collection using the survey instrument, due to the first batch not being large enough for cluster analysis after the data screening process. Future studies using MTurk should include a pilot-test HIT on MTurk, or a pre-qual HIT (Hydock, 2018) to ensure only eligible workers complete survey tasks and reduce the number of unusable responses.

As with all self-reported and anonymous survey data, acknowledgment of the possibility of false responses is warranted. However, the data screening process used for this thesis followed quality screening measures for MTurk samples such as open-text response reviews, improbable statistics evaluations, and IP addresses as suggested by previous research (e.g., Casey et al., 2017; Hauser & Schwarz, 2016; Smith et al., 2016). Based on the pre-screening process and the assumed similar consumer traits between the intended subject (MCA consumers) and the convenience sample (MTurk), the data are considered to be representative of honest and attentive reporting. Future researchers who use MTurk should continue to practice prudence and caution in data screening—the researcher recommends incorporating all of the mentioned measures to ensure data quality; however, MTurk proved to be an efficient and effective tool for data collection.

Second, in considering the participant population compared to a representative national sampling, previous research has suggested the MTurk population represents a lower income sample than a representative national sample (Casey et al., 2017), which seems to be reflected in this data sample (average income approximately \$50,000) as U.S. Census Bureau figures reported the median household income of \$69,000 for 2019 (Heavey, 2020). However, this survey asked for participant's individual income, not household income, so it is unclear how the

sample population relates to the national income figures. National figures from the Center for Disease Control and Prevention from 2016 put the average United States adult's BMI at 29.4, which is considered "overweight" and is on the verge of being "obese" (Center for Disease Control and Prevention, 2017) suggesting the sample population was actually less overweight on average than a representative population, which could be attributed to the sample source (MTurk) and/or could be indicative of a tendency among MCA consumers, an evaluation outside of the scope of this research, but worthy of future research. Future research should consider using more purposive and non-MTurk sampling methods to obtain a more representative sample.

Apart from potential limitations in the sample population, this research may have been limited by aspects of methodology. Although previous research has identified various dimensions of motivations that may drive MCA purchase intention (e.g., creative achievement, desire for uniqueness, functional; see for example: Fiore et al., 2004; Franke & Schreier, 2006; Kang & Kim, 2012; Seo & Lang, 2018), the *a priori* factor analysis for the motivation survey items emerged as a single factor. The survey instrument included elements to capture the various dimensions, but in considering time constraints of survey respondents and the exploratory nature of the study, items were limited to around two per dimension identified in literature. Future researchers should consider motivational drivers separately in regard to actual MCA purchase patterns. Moreover, this study did not examine the relationship between motivations and satisfaction explicitly, which should be rectified in subsequent investigations of the MCA consumption experience.

Additionally, although segmentation proved a useful framework for exploring the MCA consumer market, the MCA purchase patterns that were used for this segmentation did not yield significantly different clusters in regard to the variables of interest. Using MCA purchase

patterns was considered ideal for capturing the various markers of MCA consumption, and was believed to be well suited for identifying variations in other variables of interest. However, the participant population was rather homogeneous in regard to their *items per purchase*, leaving *duration of MCA purchase behavior* as the main differentiator between clusters, which limits the discussion. However, findings of this research suggest *duration of MCA purchase behavior* has interesting possibilities for future segmentation analyses; perhaps future researchers could replace *items per purchase* with an alternate variable such as gender, occupation, technology acceptance/mastery, or body satisfaction.

Regardless, using actual MCA consumers for future research is warranted, given the expanded understanding of MCA consumer's satisfaction and motivations. Although it appears to be a homogeneous market based on the data of the current study, future research should continue to expand the understanding of the various specific needs of MCA consumers. Additional variables related to sustainability such as subjective and objective environmental knowledge may also provide clarification to close the gap between sustainable attitudes (e.g., positive environmental attitudes) and sustainable behaviors. Other avenues for future studies include comparing MCA consumers to non-MCA consumers related to the studied sustainability variables examined in this research. Future studies should empirically examine the environmental and social costs and benefits of the mass customization model compared to a mass-production model. Particular attention should be given to an evaluation of returns versus deadstock. Finally, future research should explicitly consider the connections between product longevity and emotional product attachment as they relate to MCA and sustainable consumer behaviors.

REFERENCES

- 4imprint (n.d.) About Us. Retrieved from 4imprint: <https://www.4imprint.com/info/aboutus>
- Allwood, E. H. (2018, July 25). *It's not just Burberry – burning clothes is fashion's dirty open secret*. Retrieved from Dazed:
<http://www.dazeddigital.com/fashion/article/40778/1/burberry-brands-burning-clothes-sustainability-fashion-revolution>
- Amazon (n.d.) Amazon Custom Home Page. Retrieved from Amazon:
<https://www.amazon.com/Amazon-Custom/b?node=11032013011>
- Anderson-Connell, L., Ulrich, P. V., & Brannon, E. L. (2002). A consumer-driven model for mass customization in the apparel market. *Journal of Fashion Marketing and Management: An International Journal*, 6(3), 240-258. doi:10.1108/13612020210441346
- Austgulen, M. H. (2016). Environmentally sustainable textile consumption--What characterizes the political textile consumers? *Journal of Consumer Policy*, 39, 441-466. doi:10.1007/s10603-015-9305-5
- Baxter, W. L., Aurisicchio, M., & Childs, P. R. (2015). *A psychological ownership approach to designing object attachment*. Imperial College London, Design Engineering, London.
- Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research*, 20(1), 165-173.
- Boateng, G. O., Nielends, T. B., Frongillo, E. A., Melgar- Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 6(149), 1-18. doi: 10.3389/fpubh.2018.00149.
- Boër, C. R., Pedrazzoli, P., Bettoni, A., & Sorlini, M. (2013). Mass customization theory and implementation framework. In C. R. Boër, P. Pedrazzoli, A. Bettoni, & M. Sorlini, *Mass Customization and Sustainability: An Assessment Framework and Industrial Implementation* (pp. 7-31). London: Springer.
- Boër, C. R., Redaelli, C., Boër, D., & Gatti, M. T. (2018). Mass customization and personalization: A way to improved sustainability beyond a common paradox. In S. Hankammer, K. Nielsen, F. T. Piller, G. Schuh, & N. Wang (Ed.), *Customization 4.0: Proceedings of the 9th World Mass Customization & Personalization Conference (MCPC 2017), Aachen, Germany, November 20th-21st, 2017* (pp. 237-250). Cham: Springer Proceedings in Business and Economics.
- Brooks Brothers. (n.d.). *Custom Mens Dress Shirts*. Retrieved from Brooks Brothers:
<https://www.brooksbrothers.com/on/demandware.store/Sites-brooksbrothers-Site/default/Product-Configurator?id=configurator-dress-shirt>

- Brosdahl, D. J., & Carpenter, J. M. (2010). Consumer knowledge of the environmental impacts of textiles and apparel production, concern for the environment, and environmentally friendly consumption behavior. *Journal of Textile and Apparel Technology and Management*, 6(4), 1-9.
- Buecher, D., Gloy, Y.-S., Schmenk, B., & Gries, T. (2018). Individual on-demand produced clothing: Ultrafast fashion production system. In S. Hankammer, K. Nielsen, F. T. Piller, G. Schuh, & N. Wang (Ed.), *Customization 4.0: Proceedings of the 9th World Mass Customization & Personalization Conference (MCPC 2017), Aachen, Germany, November 20th-21st, 2017* (pp. 635-644). Cham: Springer Proceedings in Business and Economics.
- Buffington, J. (2011). Comparison of mass customization and generative customization in mass markets. *Industrial Management & Data Systems*. 11(1). 41-62, doi: 10.11-8/02635571111099721
- Cachon, G. P., & Swinney, R. (2011). The value of fast fashion: Quick response, enhanced design, and strategic consumer behavior. *Management Science*, 57(4), 778-795.
- Casey, Chandler, Levine, Proctor, & Strolovitch (2017). Intertemporal differences among MTurk workers: Time-based sample variations and implications for online data collection. *SAGE Open*. 2017(April-June). 1-15, doi: 10.1177/2158244017712774.
- Center for Disease Control and Prevention. (2017, August 29). *About Adult BMI*. Retrieved from Center for Disease Control and Prevention: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
- Chan, T-Y., & Wong, C.W. (2012) The consumption side of sustainable fashion supply chain: Understanding fashion consumer eco-fashion consumption decision. *Journal of Fashion Marketing and Management*, 16(2), 192-215. doi: 10.1108/13612021211222824
- Chirico, K., & Rose, M. (2017, November 1). *I Got Clothes Made For My Body From Three Different Stores And Here's How Well They Fit*. Retrieved from BuzzFeed Style: https://www.buzzfeed.com/kristinchirico/i-got-clothes-made-for-my-body-from-three-different-stores?utm_term=.hlZ2R3jr7#.hnlE47XBW
- Chmielewski and Kucker (2020). An MTurk crisis? Shifts in data quality and the impact on study results. *Social Psychological and Personality Science*. 11(4). 464-473 doi: 10.1177/1948550619875149
- Cho, E., Gupta, S., & Kim, Y.-K. (2015). Style consumption: its drivers and role in sustainable apparel consumption. *International Journal of Consumer Studies*, 39, 661-669. doi:10.1111/ijcs.12185
- Cho, H., & Wang, Y. (2010). Cultural comparison for the acceptance of online apparel customization. *Journal of Consumer Marketing*, 27(6), 550-557.

- Choudhury, A. R. (2014). Environmental impacts of the textile industry and its assessment through life cycle assessment. In S. S. Muthu (Ed.), *Road Map to Sustainable Textiles and Clothing* (pp. 1-39). Singapore: Springer Science+Business Media.
- Claudio, L. (2007). Waste Couture. *Environmental Health Perspectives*, 115(9), 448-454.
- Cobbing, M. (2018). *A crisis of convenience: The corporation behind the plastic pollution pandemic*. Greenpeace.
- Crofton, S. O., & Dopico, L. G. (2007). Zara-Inditex and the growth of fast fashion. *Essays in Economic & Business History*, 25, 41-54.
- Curtis, Abratt, Dion, & Rhoades (2011). *Review of Business*, 32(1). 47-57.
- Custom Ink. (n.d.a). *Prices*. Retrieved from Custom Ink: <https://www.customink.com/prices>
- Custom Ink. (n.d.b). *Products*. Retrieved from Custom Ink: <https://www.customink.com/products>
- Da Silveira, G., Borenstein, D., & Fogliatto, F. S. (2001). Mass customization: Literature review and research directions. *International Journal of Production Economics*, 72, 1-13.
- Davis, S. (1996). *Future Perfect*. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc.
- de Bellis, E., Hildebrand, C., Ito, K., Herrmann, A., & Schmitt, B. (2019). Personalizing the customization experience: A matching theory of mass customization interfaces and cultural information processing. *Journal of Marketing Research* 56(6), 1050-1065. doi: 10.1177/0022243719867698
- Didi, S., & Niehm, L. S. (2016). Corporate social responsibility in the retail apparel context: Exploring the consumers' personal and normative influences on patronage intention. *Journal of Marketing Channels*, 23(1), 60-76. doi:10.1080/1046669X.2016.1147892
- Didi, S., Yan, R-N., Bloodhart, B., Bajtelsmit, V., McShane, K. (2019) Exploring young adult consumers' sustainable clothing consumption intention-behavior gap: A behavioral reasoning theory perspective. *Sustainable Production and Consumption*, 18(XX), 200-209, doi: 10.1016/j.spc.2019.02.009.
- Dolnicar, S., Grün, B., & Leisch, F. (2018). Market Segmentation. In S. Dolnicar, B. Grün, & F. Leisch, *Market Segmentation Analysis: Understanding It, Doing It, and Making It Useful* (pp. 3-10). Singapore: Springer. doi:10.1007/978-981-10-8818-6
- Domina, T., & Koch, K. (2002). Convenience and frequency of recycling: Implications for including textiles in curbside recycling programs. *Environment and Behavior*, 34(2), 216-238.

- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425-442.
- El Hedhi, K., Chebat, J-C. (2009). Developing and validating a psychometric shopper-based mall equity measure. *Journal of Business Research, 62*, 581-587. doi: 10.1016/j.jbusres.2008.05.016.
- Endo, S., & Kincade, D. F. (2008). Mass customization for long-term relationship development: Why consumers purchase mass customized products again. *Qualitative Market Research: An International Journal, 11*(3), 275-294. doi:10.1108/13522750810879011
- eShakti (n.d.). How Customization Works. Retrieved from eShakti: <https://www.eshakti.com/HowItWorks.aspx>
- Faud-Lake, A. (2014). Designing together: The power of 'we think', 'we design', 'we make'. In A. Faud-Lake, & A. Faud-Lake (Ed.), *Design Activism: Beautiful strangeness for a sustainable world*. (pp. 141-164). Taylor & Francis Group. Retrieved from <http://ebookcentral.proquest.com/lib/csu/detail.action?docID=476576>
- Fiore, A. M., Lee, S.-E., & Kunz, G. (2004). Individual differences, motivations, and willingness to use a mass customization option for fashion products. *European Journal of Marketing, 38*(7), 835-849. doi:10.1108/03090560410539276
- Fletcher, K. (2007, June 1). Slow Fashion. *Ecologist*, p.61. Retrieved from Ecologist: <https://theecologist.org/2007/jun/01/slow-fashion>.
- Fletcher, K. (2014). *Sustainable fashion and textiles: Design journeys* (Second ed.). Milton Park, Abingdon, Oxon; New York: Routledge.
- Fletcher, K. (2010). Slow Fashion: An invitation for systems change. *Fashion Practice, 2*(2), 259-265. doi:10.2752/175693810X12774625387594
- Fornasiero, R., Macchion, L., & Vinelli, A. (2015). Supply chain configuration towards customization: a comparison between small and large series production. *IFAC-PapersOnLine, 48-3*, pp. 1428-1433. Milan: Elsevier.
- Fralix, M. (2001). From mass production to mass customization. *Journal of Textile and Apparel, Technology and Management, 1*(2). 1-7.
- Franke, N., & Schreier, M. (2010). Why customers value self-designed products: The importance of process effort and enjoyment. *Journal of Production Innovation Management, 27*, 1020-1031.
- Franke, N., Schreier, M., & Kaiser, U. (2010). The "I designed it myself" effect in mass customization. *Management Science, 56*(1), 125-140. doi:10.1287/mnsc.1090.1077
- Frilly (n.d.). About Us. Retrieved from Frilly: <https://www.frilly.com/about-us>

- Funderburk, J. (1994). The development of women's ready-to-wear, 1865-1914: Based on New York Times Advertisements. *Dissertation*. (C. Anderson, Ed.) University of Maryland College Park.
- Gabrielli, V., Baghi, I., & Codeluppi, V. (2013). Consumption practices of fast fashion products: A consumer-based approach. *Journal of Fashion Marketing and Management: An International Journal*, 17(2), 206-224.
- Gembariski, P. C., Schoorman, T., Schreiber, D., Knackstedt, R., & Lachmayer, R. (2018). Effects of mass customization on sustainability: A literature-based analysis. In S. Hankammer, K. Nielsen, F. T. Piller, G. Schuh, & N. Wang (Ed.), *Customization 4.0: Proceedings of the 9th World Mass Customization & Personalization Conference (MCPC 2017), Aachen, Germany, November 20th-21st, 2017* (pp. 285-300). Cham: Springer Proceedings in Business and Economics.
- Gerber Technology. (2016, May 3). *Gerber technology's digital solutions links data, smart machines to drive mass production and mass customization*. Retrieved from Gerber Technology: <https://www.gerbertechnology.com/news/gerber-technologys-digital-solutions-links-data-smart-machines-to-drive-mass-production-and-mass-customization/>
- Gerber Technology. (n.d.). *Case Study: Brooks Brothers*. Retrieved from Gerber Technology: <https://www.gerbertechnology.com/fashion-apparel/interior/case-study/brooks-brothers/>
- Grauerholz, L., & Bubriski-McKenzie, A. (2012). Teaching about consumption: The "not buying it project". *Teaching Sociology*, 40(4), 332-348. doi:10.1177/0092055X12441713
- Grosso, C., Forza, C., & Trentin, A. (2017). Supporting the social dimension of shopping for personalized products through online sales configurators. *Journal of Intelligent Information Systems*, 49(XX), 9-35. doi: 10.1007/s10844-016-0429-0.
- Gwozdz, W., Nielsen, K. S., & Müller, T. (2017). An environmental perspective on clothing consumption: Consumer segments and their behavioral patterns. *Sustainability*, 9(5), 762. doi:10.3390/su9050762
- Hankammer, S., Antons, D., Kleer, R., & Piller, F.T. (2020) Taking stock of customization research: a computational review and interdisciplinary research agenda. Available at SSRN: <https://ssrn.com/abstract=3632997>. doi: 10.2139/ssrn.3632997
- Harrabin, R. (2019, August 29) Climate change: Big lifestyle changes 'needed to cut emissions'. Retrieved from BBC: <https://www.bbc.com/news/science-environment-49499521>
- Harris, F., Roby, H., Dibb, S. (2016). Sustainable clothing: challenges, barriers and interventions for encouraging more sustainable consumer behaviour. *International Journal of Consumer Studies*, 40(3), 309-318. doi: 10.1111/ijcs.12257
- Hauser and Schwarz (2016). Attentive turkers: MTurk participants perform better on online attention checks than do subject pool participants. *Behavioral Research*. 48. 400-407. doi: 10.3758/s13428-015-0578-z

- Hawa, H. (2018). Attitudes toward apparel mass customization: Canadian consumer segmented by lifestyle and demographics. In S. Hankammer, K. Nielsen, F. T. Piller, G. Schuh, & N. Wang (Ed.), *Customization 4.0: Proceeding of the 9th World Mass Customization & Personalization Conference (MCPC 2017), Aachen, Germany, November 20th-21st, 2017* (pp. 671-684). Cham: Springer Proceedings in Business and Economics.
- Heavey, S. (2020, September 15). *U.S. median income hit record high in 2019, Census data shows*. Retrieved from Reuters: <https://www.reuters.com/article/us-usa-economy-census-idUSKBN2662EY>
- Hunt, D. M., Radford, S. K., & Evans, K. R. (2013). Individual differences in consumer value for mass customized products. *Journal of Consumer Behaviour, 12*, 327-336.
- Hydock, C. (2018). Assessing and overcoming participant dishonesty in online data collection. *Behavioral Research Methods, 50*. 1563-1567, doi: 10.3758/s13428-017-0984-5
- Hyllegard, K. H., Yan, R.-N., Ogle, J. P., & Lee, K.-H. (2012). Socially responsible labeling: The impact of hang tags on consumers' attitudes and patronage intentions toward an apparel brand. *Clothing & Textiles Research Journal, 000(00)*, 1-16. doi:10.1177/0887302X11433500
- Indochino. (n.d.). *Suits*. Retrieved from Indochino: <https://www.indochino.com/collection/suits>
- Joung, H.-M. (2013). Materialism and clothing post-purchase behaviors. *Journal of Consumer Marketing, 30(6)*, 530-537. doi:10.1108/JCM-08-2013-0666
- Joung, H.-M. (2014). Fast fashion consumers' post-purchase behaviours. *International Journal of Retail & Distribution Management, 42(8)*, 688-697. doi:10.1108/IJRDM-03-2013-0055
- Kamali, N., & Loker, S. (2002). Mass customization: On-line consumer involvement in product design.
- Kang, J., Liu, C., & Kim, S.-H. (2013). Environmentally sustainable textile and apparel consumption: the role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. *International Journal of Consumer Studies, 37*, 442-452. doi:10.1111/ijcs.12013
- Kang, J.-Y. M., & Kim, E. (2012). e-Mass customisation apparel shopping: effects of desire for unique consumer products and perceived risk on purchase intentions. *International Journal of Fashion Design, Technology and Education, 5(2)*, 91-103.
- Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally responsible behavior. *Journal of Business Research, 61*, 885-893.
- Kohtala, C. (2015). Addressing sustainability in research on distributed production: an integrated literature review. *Journal of Cleaner Production, 106(XX)*, 654-668, doi: 10.1016/j.jclepro.2014.09.039

- Koszewska, M. (2016). Understanding consumer behavior in the sustainable clothing market: Model development and verification. In S. S. Muthu, & M. A. Gardetti (Eds.), *Green Fashion* (Vol. 1, pp. 43-94). Singapore: Springer Science + Business Media. doi:10.1007/978-981-10-0111-6
- Kumar, B., Manrai, A. K., & Manrai, L. A. (2017). Purchasing behaviour for environmentally sustainable products: A conceptual framework and empirical study. *Journal of Retailing and Consumer Services*, 34, 1-9. doi:10.1016/j.jretconser.2016.09.004
- Kunz, G. I., Karpova, E., & Garner, M. B. (2016). Sustainability in textile and apparel industries. In G. I. Kunz, E. Karpova, & M. B. Garner, *Going Global: The Textile and Apparel Industry* (3rd ed., pp. 92-126). New York: Fairchild Books.
- Kuo, Hu, & Yang (2013). Effects of inertia and satisfaction in female online shoppers on repeat-purchase intention: The moderating roles of word-of-mouth and alternative attraction. *Managing Service Quality* 23(3). 168-187, doi: 10.1108/09604521311312219
- Lai, J. and Bower, M. (2020). Evaluation of technology use in education: Findings from a critical analysis of systematic literature reviews. *Journal of Computer Assisted Learning*. 36(3). 241-259, doi: 10.1111/jcal.12412
- Laitala, K. (2014). Consumers' clothing disposal behaviour - a synthesis of research results. *International Journal of Consumer Studies*, 38, 444-457. doi:10.1111/ijcs.12088
- LaMorte, W. (2019). Diffusion of Innovation Theory. Retrieved from Behavior Change Models: <https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/behavioralchangetheories4.html> (11/30/2020)
- Lang, C., Armstrong, C. M., & Brannon, L. A. (2013). Drivers of clothing disposal in the US: An exploration of the role of personal attributes and behaviors in frequent disposal. *International Journal of Consumer Studies*, 37, 706-714. doi:10.1111/ijcs.12060
- Larsson, J., (2012). Customer perspective on mass-customized knitwear. *Fashion Practice: The Journal of Design, Creative Process & Fashion Industry*. 4(2), 177-195. doi: 10.2752/175693812X13403765252307
- Lee, H.-H., & Chang, E. (2011). Consumer attitudes toward online mass customization: An application of extended technology acceptance model. *Journal of Computer-Mediated Communication*, 16, 171-200.
- Lee, H.-H., & Moon, H. (2015). Perceived risk of online apparel mass customization: Scale development and validation. *Clothing and Textiles Research Journal*, 33(2), 115-128.
- Lee, H.-H., Damhorst, M. L., Campbell, J. R., Loker, S., & Parsons, J. L. (2011). Consumer satisfaction with a mass customized internet apparel shopping site. *International Journal of Consumer Studies*, 35, 316-329. doi:10.1111/j.1470-6431.2010.00932.x

- Lehmann, M., Tärneberg, S., Tochtermann, T., Chalmer, C., Eder-Hansen, J., Seara, J. F., . . . Deichmann, S. (2018). *Pulse of the Fashion Industry*. Copenhagen & Boston: Global Fashion Agenda and The Boston Consulting Group.
- Li, H., Kuo, C. & Russel, M.G. (1999). The impact of perceived channel utilities, shopping orientations, and demographics on the consumer's online buying behavior. *Journal of Computer-Mediated Communication*, 5(2). doi: 10.1111/j.1083-6101.1999.tb00336.x
- Makuch, R. personal communication, June 26, 2020
- McCredie and Morey (2019). Who are the Turkers? A characterization of MTurk workers using the personality assessment inventory. *Assessment* 26(5). 759-766 doi: 10.1177/1073191118760709.
- McGregor, K. (2014, July 4). *Retailers back Levi's decision to simplify Curve ID range*. Retrieved from Drapers Online: <https://www.drapersonline.com/news/retailers-back-levis-decision-to-simplify-curve-id-range/5061791.article>
- McNeil, P. (2011). Haute Couture within a fashion studies perspective. In T. R. Armoury, & F. Andersson (Ed.), *Royal Vintage (exhibition catalogue)* (pp. 175-183). Stockholm: The Royal Armoury.
- Merle, A., Chandon, J.-L., Roux, E., & Alizon, F. (2010). Perceived value of the mass-customized product and mass customization experience for individual consumers. *Production and Operations Management*, 19(5), 503-514.
- Michel, S., Kruezer, M., Kühn, R., Stringfellow, A., & Schumann, J. H. (2009). Mass-customised products: Are they bought for uniqueness or to overcome problems with standard products? *Journal of Customer Behaviour*, 8(4), 307-327.
- mTailor. (n.d.). *Home*. Retrieved from mTailor: <https://www.mtailor.com/>
- MTurk (n.d.). *Overview*. Retrieved from MTurk: <https://www.mturk.com/>
- Mugge, R., Schifferstein, H. N., & Schoormans, J. P. (2010). Product attachment and satisfaction: understanding consumers' post-purchase behavior. *Journal of Consumer Marketing*, 27(3), 271-282. doi:10.1108/07363761011038347
- Mugge, R., Schoormans, J. P., & Schifferstein, H. N. (2009). Emotional bonding with personalised products. *Journal of Engineering Design*, 20(5), 467-476. doi:10.1080/09544820802698550
- Munim, Z. H., Noor, T. (2020). Young people's perceived service quality and environmental performance of hybrid electric bus service. *Travel Behavior and Society*, 20, 133-143. doi: 10.1016/j.tbs.2020.03.003.

- Nayak, R., Padhye, R., Wang, L., Chatterjee, K., & Gupta, S. (2015). The role of mass customisation in the apparel industry. *International Journal of Fashion Design, Technology and Education*, 8(2), 162-172. doi: 10.1080/17543266.2015.1045041
- New Agencies. (2013, September 16). *Vivienne Westwood: Everyone buys too many clothes*. Retrieved from Telegraph UK: <https://fashion.telegraph.co.uk/news-features/TMG10312077/Vivienne-Westwood-Everyone-buys-too-many-clothes.html>
- Niinimäki, K., & Hassi, L. (2011). Emerging design strategies in sustainable production and consumption of textiles and clothing. *Journal of Cleaner Production*, 19, 1876-1883. doi:10.1016/j.clepro.2011.04.020
- Nike (n.d.). *Nike by You*. Retrieved from Nike: <https://www.nike.com/nike-by-you>
- Ogle, J., Hyllegard, K. H., Yan, R.-N., & Littrell, M. A. (2014). Segmenting the teen girl apparel market: differences in fashion involvement, materialsim and social responsibility. *Young Consumers*, 15(2), 153-166. doi:10.1108/YC-08-2013-00388
- Oliver, R. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research*, 20(XX), 418-430.
- Optitex. (n.d.). *Home*. Retrieved from Optitex: <https://optitex.com/>
- Ortland, K. (2006). *Interview with Robert Kalin of Etsy*. Retrieved from Web Archive: <https://web.archive.org/web/20100914204643/http://www.seomoz.org/web2.0/interview/etsy/2006>
- Park, J., Nam, Y., Choi, K.-m., Lee, Y., & Lee, K.-H. (2009). Apparel consumers' body types and their shopping characteristics. *Journal of Fashion Marketing and Management: An International Journal*, 13(3), 372-393. doi:10.1108/13612020910974500
- Park, M., & Yoo, J. (2018). Benefits of mass customized products: Moderating role of product involvement and fashion innovativeness. *Heliyon*, 4, 1-25.
- Periyasamy, A. P., Ramamoorthy, S. K., Rwawiire, S., & Zhao, Y. (2018). Sustainable wastewater treatment methods for textile industry. In S. S. Muthu (Ed.), *Sustainable Innovations in Apparel Production* (pp. 21-87). Singapore: Springer Nature. doi:10.1007/978-981-10-8591-8_2
- Piller, F. T. (2005, December 22). *Re-Post: Analysis: Why Levi Strauss finally closed it's "Original Spin" MC operations (from MC News 1/2004)*. Retrieved from Mass Customization & Open Innovation News: A blog by Frank T. Piller: https://mass-customization.blogs.com/mass_customization_open_i/2005/12/repost_analysis.html
- Pine II, B. J., Victor, B., & Boynton, A. C. (1993, September-October). Making mass customization work. *Harvard Business Review*, 71(5), 107-116.

- Pookulangara, S., & Shephard, A. (2013). Slow fashion movement: Understanding consumer perceptions--An exploratory study. *Journal of Retailing and Consumer Services*, 20, 200-206.
- Proper Cloth (n.d.). *Design a Shirt*. Retrieved from Proper Cloth: <https://propercloth.com/design-a-shirt/>
- Ratcliffe, A. (2017). Are Mature Female Consumers Well Served by the Fashion Retail Sector?. *19th European Association for Education and Research in Commercial Distribution (EAERCD) Conference, 4th - 6th July, 2017, Technological University Dublin*.
- Razzaq, A., Ansari, N. Y., Razzaq, Z., & Awan, H. M. (2018, April-June). The impact of fashion involvement and pro-environmental attitude on sustainable clothing consumption: The moderating role of Islamic religiosity. *Special Collection - Sustainable Marketing*, 1-17.
- Rita & Phil. (n.d.). *All custom skirts*. Retrieved from Rita & Phil: <https://www.ritaphil.com/collections/all-custom-skirts>
- Rogers, E. (2003) *Diffusion of Innovations*. (Location): Free Press
- Ross, M. (Producer), & Morgan, A. (Director). (2015). *The True Cost* [Motion Picture]. United States.
- Saleem, M. A., Eagle, L., & Low, D. (2018, August). Market segmentation based on eco-socially conscious consumers' behavioral intentions: Evidence from an emerging economy. *Journal of Cleaner Production*, 193, 14-27. doi:10.1016/j.jclepro.2018.05.067
- Saricam, C., & Okur, N. (2019). Analysing the consumer behavior regarding sustainable fashion using theory of planned behavior. In S. S. Muthu (Ed.), *Consumer Behavior and Sustainable Fashion Consumption* (pp. 1-38). Singapore: Springer Nature. doi:10.1007/978-981-13-1265-6
- Sarti, S., Darnall, N., & Testa, F. (2018). Market segmentation of consumers based on their actual sustainability and health-related purchases. *Journal of Cleaner Production*, 192, 270-280. doi:10.1016/j.jclepro.2018.04.188
- Schreier, M. (2006). The value increment of mass-customized products: and empirical assessment. *Journal of Consumer Behaviour*, 5, 317-327.
- Senanayake, M. M., & Little, T. J. (2010). Mass customization: Points and extent of apparel customization. *Journal of Fashion Marketing and Management*, 14(2), 282-299. doi:10.1108/13612021011046110
- Seo, S., & Lang, C. (2018). Psychological antecedent to customized apparel purchases. *Journal of Fashion Marketing and Management*, 23(1), 66-81. doi: 10.1108/JFMM-10-2018-0128
- Seo, S., & Lang, C. (2019). Psychogenic antecedents and apparel customization: moderating effects of gender. *Fashion and Textiles*, 6(XX), 1-19. doi: 10.1186/s40691-019-0175-3

- Sharma, R., & Jha, M. (2017). Values influencing sustainable consumption behaviour: Exploring the contextual relationship. *Journal of Business Research*, 76, 77-88. doi:10.1016/j.jbusres.2017.03.010
- Shatzman, C. (2017, August 29). *New site Frilly makes customizable made-to-order fashion with just a few clicks*. Retrieved from Forbes: <https://www.forbes.com/sites/celeshatzman/2017/08/29/new-site-frilly-makes-customizable-made-to-order-fashion-with-just-a-few-clicks/#28ac278f4ba8>
- Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: a customer-centric approach to sustainability. *Journal of the Academy of Marketing Science*, 39, 21-39. doi:10.1007/s11747-010-0216-3
- Shih, W. C., & Agrafiotis, K. (2017). Competitiveness in a slow relational production network: The case of London's Savile Row Tailors. *Clothing and Textiles Research Journal*, 35(3), 143-155. doi:10.1177/0887302X17690023
- Smith, W. R. (1956). Product differentiation and market segmentation as alternative marketing strategies. *Journal of Marketing*, 21(1), 3-8. doi:10.2307/1247695
- Smith, Roster, Golden, and Albaum (2016). A multi-group analysis of online survey respondent data quality: Comparing a regular USA consumer panel to MTurk samples. *Journal of Business Research*. 69. 3139-3148. Doi: 10.1016/j.jbusres.2015.12.0020148-2963
- The Siberian Times Reporter. (2016, August 23). World's oldest needle found in Siberian cave that stitches together human history. *The Siberian Times*. Retrieved from <https://siberiantimes.com/science/casestudy/news/n0711-worlds-oldest-needle-found-in-siberian-cave-that-stitches-together-human-history/>
- Trentin, A., Perin, E., & Forza, C. (2014). Increasing the consumer-perceived benefits of a mass-customization experience through sales-configurator capabilities. *Computers in Industry*, 65, 693-705.
- Trivedi, R. H., Patel, J. D., & Acharya, N. (2018). Causality analysis of media influence on environmental attitude, intention and behaviors leading to green purchasing. *Journal of Cleaner Production*, 196, 11-22.
- Ulrich, P. V., Anderson-Connell, L., & Wu, W. (2003). Consumer co-design of apparel for mass-customization. *Journal of Fashion Marketing and Management: An International Journal*, 7(4), 398-412.
- Underground Printing, (n.d.a). *Our Story*. Retrieved from Underground Printing: <https://undergroundshirts.com/pages/our-story>
- Underground Printing (n.d.b). *“Organic” search results*. Retrieved from Underground Printing: <https://undergroundshirts.com/search?q=organic&type=product>

- United Nations. (n.d.). *The Lazy Person's Guide to Saving the World*. Retrieved from Sustainable Development Goals: Take Action: <https://www.un.org/sustainabledevelopment/takeaction/>
- United States Census Bureau (USCB). (2020). *E-Commerce Historic 1998-2015*. Retrieved from Census Bureau: https://www2.census.gov/programs-surveys/e-stats/tables/2015/historic/table_4.xls.
- Unzipped. (2018, September 21). *Levi.com introduces online cusotmization*. Retrieved from Levi Strauss & Co.: Unzipped Blog: <https://levistrauss.com/unzipped-blog/2018/09/21/levi-com-introduces-online-customization/>
- Verain, M. C., Sijtsema, S. J., & Antonides, G. (2016). Consumer segmentation based on food-category attribute importance: The relation with healthiness and sustainability perceptions. *Food Quality and Preference*, 48, 99-106. doi:10.1016/j.foodqual.2015.08.012
- Walter, Seibert, Goering, & O'Boyle Jr (2019). A tale of two sample sources: Do results from online panel data and conventional data converge? *Journal of Business and Pyschology* 34. 425-452, doi: 10.1007/s10869-018-9552-y.
- Wan, X., Wang, T., Zhang, W., & Cao, J. (2017). Perceived value of online customization experience in China: Concept, measurement, and consequences. *Journal of High Technology Management Research*, 28, 17-28.
- Wang, Z., Zhang, M., Sun, H., & Zhu, G. (2016). Effects of standardization and innovation on mass customization: An empirical investigation. *Technovation*, 48-49, 79-86.
- Weber, Lynes, & Young (2017). Fashion interest as a driver for consumer textile waste management: reuse, recycle or disposal. *International Journal of Consumer Studies* 41. 207-215, doi: 10.1111/ijcs.12328
- Westbrook, R., & Black, W. (1985). A motivation-based shopper typology. *Journal of Retailing*, 61(1), 78-103.
- Williams, R., Mazzotta, L. (Producers), McIlvride, D. (Writer), McIlvride, D., & Williams, R. (Directors). (2017). *River Blue* [Motion Picture]. Canada.
- Wind, Y. (1978, August). Issues and Advances in Segmentation Research. *Journal of Marketing Research*, 15(3), 317-337. doi:10.2307/3150580
- WRAP.org (2015). *Extending the Life of Clothes*. Retrieved from WRAP: <http://www.wrap.org.uk/content/extending-life-clothes>
- Yang, J.-H., Kincade, D. H., & Chen-Yu, J. H. (2015). Types of apparel mass customization and levels of modularity and variety: Applicationof the Theroy of Inventive Problem Solving. *Clothing and Textiles Research Journal*, 33(3), 199-212. doi:10.1177/0887302X15576403

Yu, U.-J., & Park, J. (2014). Consumers' virtual product experiences and risk perceptions of product performance in the online co-design practice: A case of NIKEiD. *Family and Consumer Sciences Research Journal*, 43(1), 29-46. doi:10.1111/fcsr.12079

Zakim, M. (2003). *Ready-made democracy: A history of men's dress in the American republic, 1760-1860*. Chicago: The University of Chicago Press.

Zazzle. (n.d.). *Custom T-shirts*. Retrieved January from Zazzle:
<https://www.zazzle.com/custom/tshirts>

APPENDIX A – RESEARCH INSTRUMENT INVITATION LETTER



Customized Apparel Consumer Survey

Dear Participants:

This survey is interested in consumers who have experience customizing, purchasing, and owning customized apparel products. The purpose of this study is to develop consumer profiles of current customized apparel consumers and understand the relationship between these consumers and their customized apparel product(s). We are looking for participants over the age of 18 who have purchased at least one clothing item that they helped to customize.

If you qualify and decide to participate, you will respond to a questionnaire that includes demographic, and consumer behavior items related your apparel shopping behaviors, and experiences. Please allow 10-15 minutes to complete the survey. We greatly appreciate your contribution to this research but would like to note your participation is voluntary. Feel free to skip questions or stop the survey at any time. Confidentiality is ensured for all participants and all answers will remain anonymous with a numeric code assigned to responses rather than your name.

To thank you for your participation, there will be an incentive of \$1.35. You will receive the incentive directly from the Amazon Mechanical Turk system after your completed survey has been accepted by the researchers. If you do not qualify for this survey because you do not have experience customizing your own apparel products, your survey will not be accepted, and you will receive no more than \$0.25 for your responses.

There is no known risk or direct benefit for participating in this research, but your time and responses are greatly appreciated. If you have any questions, please feel free to contact the researcher at Jessica.Shaver@colostate.edu. If you have any questions about human research participants' rights, please contact the CSU institutional review board at RICRO_IRB@mail.colostate.edu.

Thank you in advance for considering our invitation to participate in the survey.

Sincerely,

Ruoh-Nan (Terry) Yan, Ph.D., Associate Professor
Dept. of Design & Merchandising
Colorado State University
Principal Investigator

Jessica Shaver, Graduate Student
Dept. of Design & Merchandising
Colorado State University
Co-Principal Investigator

APPENDIX B – SURVEY INSTRUMENT

Part I. MCA Purchase Patterns

Your Experience with Online Customized Apparel Products

To qualify for this survey, you must have purchased daily wear apparel from an online custom apparel retailer in the last two years. Daily wear apparel includes any garment such as shirts, pants, dresses, skirts, and jackets which are worn for daily interactions like work, errands, social gathers (not including custom apparel purchased for special occasions). Online custom apparel retailers allow consumers to select customization or modification prior to purchasing, such as changing sleeve or hem length, neckline or collar style, or print/pattern. Customized items purchased are then made to order and delivered to the consumer.

If you have no experience with this, please exit the survey now.

By clicking yes below you acknowledge that you qualify for this survey as a previous consumer of customized apparel products. If you click no and continue with the survey you will not be entitled to the full \$1.35 incentive.

Yes

No

How many times have you purchased customized apparel products over the past two years? _____

How many customized apparel products have you purchased over the past two years? _____

In what year did you make your first customized apparel purchase? _____

When I buy from retailers offering apparel customization I tend to customize the following aspects:

	1 Never	2	3	4	5	6	7 Always
Size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fabric Quality (material, fiber content)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fabric pattern (print, plaid, stripe, custom)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How long do you keep or intend to keep your customized apparel products?

- less than 1 year
- 1-2 years
- 3-4 years
- 5-6 years
- 7-8 years
- 9-10 years
- 11+ years

What percentage of your wardrobe is...

- _____ Customized apparel products
- _____ Non-custom apparel products bought new
- _____ Non-custom apparel products bought (or acquired) second-hand
- _____ Other (e.g., rental, gift, swap, etc.)

- _____ Total (must add up to 100)

What customized apparel retailers do you usually buy from? (List all that apply)

What types of customized products have you purchased? (List all types of products)

Why do you purchase from these retailers? (List all reasons that come to mind)

Part II. MCA Specific Consumer Characteristics (starts on next page)

Part II. MCA Specific Consumer Characteristics

Your Overall Satisfaction and Experience with Apparel Customization.

The statements below address the consumer experience of purchasing and using customized apparel products. For each statement indicate the level to which you agree or disagree (1 = strongly disagree, 7 = strongly agree).

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
1. Apparel customization has allowed me to create products that are most adapted to my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The customized apparel products I have purchased are products that I really wanted to have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. With these customized apparel products, I will not look like everybody else.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. With the customization website (or app), I could design apparel that others will not have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. With these customized apparel products, I have a small element of differentiation compared to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The customized apparel products convey exactly who I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I found it fun to customize the apparel products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I really enjoyed being able to customize what I wear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The customization platform gave me a lot of freedom in the creation of the apparel products, and I really enjoyed it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I can be creative while customizing what I wear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey items continue on next page...

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
11. The customized apparel products are exactly what I had hoped for.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. The apparel products I created meet my expectations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I feel satisfied with the customized apparel products I have purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I am happy with the experiences I have had customizing apparel products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. The customized apparel I have purchased better meets my style preferences than standardized apparel products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I have been satisfied with the degree of customization I am able to achieve in the products I have purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I have a bond with the customized apparel I have purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Customized apparel products I have purchased do not have special meanings for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. The customized apparel products I have purchased are very dear to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I am very attached to the customized apparel I have purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I feel connected to the customized apparel products I have purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. I keep my customized apparel products longer than apparel that was already made when I bought it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part III. Sustainability Specific Consumer Characteristics (starts next page)

Part III. Sustainability Specific Consumer Characteristics

Your Knowledge About the Environment and the Impact of Apparel Products

For each of the following statements identify the degree to which you agree (1 = strongly disagree, 7 = strongly agree).

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
1. I am very concerned about the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I would be willing to reduce my consumption to help protect the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Major political change is necessary to protect the natural environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Major social changes are necessary to protect the natural environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Humans are severely abusing the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I know about the environmental impacts of the clothing I purchase.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I know about the social impacts of the clothing I purchase.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I know what the term "Fast Fashion" means.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I know about the impact of fast fashion products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I think customized apparel is a more sustainable alternative than apparel products commonly available on the market.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are you paying attention? If yes, please check “Extremely happy”.

- Extremely happy
- Somewhat happy
- Neither happy nor unhappy
- Somewhat unhappy
- Extremely unhappy

The following statements ask about specific elements of the apparel supply chain and production process. For each statement below indicate if you think it is true or false.

	True	False
1. Chemical pollutants are not produced during processing of natural fibers such as cotton.	<input type="radio"/>	<input type="radio"/>
2. The dyes and chemicals used in apparel production are not harmful to the environment.	<input type="radio"/>	<input type="radio"/>
3. Textile dyeing and finishing processes use a lot of water.	<input type="radio"/>	<input type="radio"/>
4. Clothing manufacturers generally provide non-hazardous workplaces for their employees.	<input type="radio"/>	<input type="radio"/>
5. Most donated clothing goes into landfills.	<input type="radio"/>	<input type="radio"/>

Part IV. Sustainable Consumer Behaviors (starts on next page)

Part IV. Sustainable Consumer Behaviors

Your Purchasing and Consumption Behaviors

The statements below relate to your purchase, use, and disposal behaviors of apparel and non-apparel consumer products.

For each statement below indicate how often you exhibit the described behavior (1 = never, 7 = always).

	1 Never	2	3	4	5	6	7 Always
1. I buy clothing that is made with recycled content.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I buy clothing that is made of organically grown natural fibers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I buy clothing which is produced in an environmentally friendly manner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I dispose of clothing in an environmentally friendly manner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I purposely select fabrics that require cooler washing temperature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I purposely select fabrics that require shorter drying time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I purposely select fabrics that require less ironing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I donate my clothes when I no longer use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I reuse clothing products for other purposes to get the most out of them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I wear second-hand or used clothing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I have my clothes repaired or mended to help them last longer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I buy higher quality, more durable clothes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I buy environmentally friendly products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I buy organic food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I use products made from recycled materials (e.g., post-consumer paper products).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey items continue on next page...

	1 Never	2	3	4	5	6	7 Always
16. I recycle household waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I use products I have purchased for as long as possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I commute via public transportation, carpool, or bicycle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I conserve household energy use. (e.g. electricity).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I avoid purchasing products that are harmful to the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part V. Demographics

Your Demographic Information

Please provide the demographic information requested below.

Your Age: _____

Your Education:

- Less than high school degree
 - High school graduate (high school diploma or equivalent including GED)
 - Some college but no degree
 - Associate degree in college (2-year)
 - Bachelor's degree in college (4-year)
 - Master's degree
 - Doctoral degree
 - Professional degree (JD, MD)
-

Your Gender:

- Female
 - Male
 - Other (specify, if desired) _____
-

Your Income:

- Less than \$20,000
- \$20,000 to \$39,999
- \$40,000 to \$59,999
- \$60,000 to \$79,999
- \$80,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,999
- \$200,000 to \$249,999
- \$250,000 and above

On average, how much do you usually spend on your apparel purchases in a six-month period? _____

On average, how many items of apparel products do you purchase in a six-month period? _____

Your Height: (ft', in"): _____

How much do you weigh? (lbs.): _____

Customized apparel is thought to offer size and fit advantages over the products that are commonly available in the marketplace. For the statements below consider your experience with the **ready-made** products that are commonly available in-stores and online, and indicate the level of agreement as it relates to your experience with these products. (1 = strongly disagree, 7 = strongly agree)

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
When shopping for clothes I tend to run into fit issues with products commonly available in the market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When shopping for clothes, I don't always find the size I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider my body type to be atypical.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a hard time finding clothes that fit me well due to my body type.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you



Thank you for your participation!

End of Survey

APPENDIX C – MULTI-GROUP FACTOR ANALYSIS RESULTS

<i>Motivations for MCA Purchases</i>	Dataset 1 n = 220	Dataset 2 n = 99
<i>Variance Explained^b</i>	49.64%	50.46%
<i>Reliability^b</i>	.87	.87
Factor Loading		
<i>Item 1. Apparel customization has allowed me to create products that are most adapted to what I am looking for.</i>	.66	.58
<i>Item 2. The customized apparel products I have purchased are products that I really wanted to have</i>	.61	.67
<i>Item 3. With these customized apparel products, I will not look like everybody else.</i>	.66	.69
<i>Item 4. With the customization website (or app), I could design apparel that others will not have.</i>	.69	.72
<i>Item 5. With these customized apparel products, I have a small element of differentiation compared to others.^a</i>	-	-
<i>Item 6. The customized apparel products convey exactly who I am.</i>	.67	.60
<i>Item 7. I found it fun to customize the apparel products.</i>	.77	.75
<i>Item 8. I really enjoyed being able to customize what I wear.</i>	.76	.82
<i>Item 9. The customization platform gave me a lot of freedom in the creation of the apparel products, and I really enjoyed it.</i>	.78	.78
<i>Item 10. I can be creative while customizing what I wear.</i>	.74	.74

Table Note. ^a. Item dropped from final analysis; ^b. Variance and reliability stats do not include dropped items.

<i>Satisfaction with MCA Product and Experience</i>	Dataset 1 n = 220	Dataset 2 n = 99
<i>Variance Explained</i>	60.80%	63.35%
<i>Reliability</i>	.87	.88
Factor Loading		
<i>Item 1. The customized apparel products are exactly what I had hoped for.</i>	.76	.82
<i>Item 2. The apparel products I created meet my expectations.</i>	.79	.83
<i>Item 3. I feel satisfied with the customized apparel products I have purchased.</i>	.82	.75
<i>Item 4. I am happy with the experiences I have had customizing apparel products.</i>	.81	.82
<i>Item 5. The customized apparel I have purchased better meets my style preferences than standardized apparel products.</i>	.69	.74
<i>Item 6. I have been satisfied with the degree of customization I am able to achieve in the products I have purchased.</i>	.80	.82

<i>Emotional Product Attachment</i>	Dataset 1 n = 220	Dataset 2 n = 99
<i>Variance Explained</i> ^b	70.20%	72.11%
<i>Reliability</i> ^b	.89	.90
Factor Loading		
<i>Item 1. I have a bond with the customized apparel I have purchased.</i>	.81	.82
<i>Item 2. Customized apparel products I have purchased do not have special meaning for me.</i> ^a	-	-
<i>Item 3. The customized apparel products I have purchased are very dear to me.</i>	.88	.89
<i>Item 4. I am very attached to the customized apparel I have purchased.</i>	.89	.92
<i>Item 5. I feel connected to the customized apparel products I have purchased.</i>	.86	.88
<i>Item 6. I will keep my customized apparel products longer than apparel that was already made when I bought it.</i>	.73	.73

Table Note5. ^a. Item dropped from analysis; ^b. Variance and reliability stats do not include dropped items.

<i>Environmental Attitudes</i>	Dataset 1 n = 220	Dataset 2 n = 99
<i>Variance Explained</i>	70.55%	71.58%
<i>Reliability</i>	.90	.90
Factor Loading		
<i>Item 1. I am very concerned about the environment.</i>	.82	.84
<i>Item 2. I would be willing to reduce my consumption to help protect the environment.</i>	.82	.79
<i>Item 3. Major political change is necessary to protect the natural environment.</i>	.86	.85
<i>Item 4. Major social changes are necessary to protect the natural environment.</i>	.88	.90
<i>Item 5. Humans are severely abusing the environment.</i>	.81	.85

Sustainable Apparel Behaviors		Dataset 1 n = 220	Dataset 2 n = 99
SAB1 Pre-purchase behaviors			
	<i>Variance Explained^b</i>	45.08%	46.55%
	<i>Reliability^b</i>	.86	.89
Factor Loadings			
<i>Item 1. I buy clothing that is made with recycled content.</i>		.75	.78
<i>Item 2. I buy clothing that is made of organically grown natural fibers.</i>		.78	.81
<i>Item 3. I buy clothing which is produced in an environmentally friendly manner.</i>		.78	.80
<i>Item 5. I purposely select fabrics that require cooler washing temperature.</i>		.77	.83
<i>Item 6. I purposely select fabrics that require shorter drying time.</i>		.81	.80
<i>Item 7. I purposely select fabrics that require less ironing.</i>		.64	.61
<i>Item 12. I buy higher quality, more durable clothes.^a</i>		-	-
SAB2 Post-purchase behaviors			
	<i>Variance Explained^b</i>	13.43%	13.20%
	<i>Reliability^b</i>	.72	.67
Factor Loading			
<i>Item 4. I dispose of clothing in an environmentally friendly manner.^a</i>		-	-
<i>Item 8. I donate my clothes when I no longer use them.</i>		.62	.84
<i>Item 9. I reuse clothing products for other purposes to get the most out of them.</i>		.74	.61
<i>Item 10. I wear second-hand or used clothing.</i>		.79	.66
<i>Item 11. I have my clothes repaired or mended to help them last longer.</i>		.67	.59

Table Note6. ^a. Item dropped from analysis; ^b. Variance and reliability stats do not include dropped items.

General Sustainable Behavior		Dataset 1 n = 220	Dataset 2 n = 99
	<i>Variance Explained^b</i>	55.99%	54.89%
	<i>Reliability^b</i>	.83	.83
Factor Loading			
<i>Item 1. I buy environmentally friendly products.</i>		.81	.88
<i>Item 2. I buy organic food.</i>		.70	.75
<i>Item 3. I use products made from recycled materials.</i>		.77	.78
<i>Item 4. I recycle household waste.</i>		.67	.58
<i>Item 5. I use products I have purchased for as long as possible.^a</i>		-	-
<i>Item 6. I commute via public transportation, carpool, or bicycle.^a</i>		-	-
<i>Item 7. I conserve household energy use. (e.g. electricity).</i>		.67	.53
<i>Item 8. I avoid purchasing products that are harmful to the environment.</i>		.85	.86

Table Note. ^a. Item dropped from analysis; ^b. Variance and reliability stats do not include dropped items.

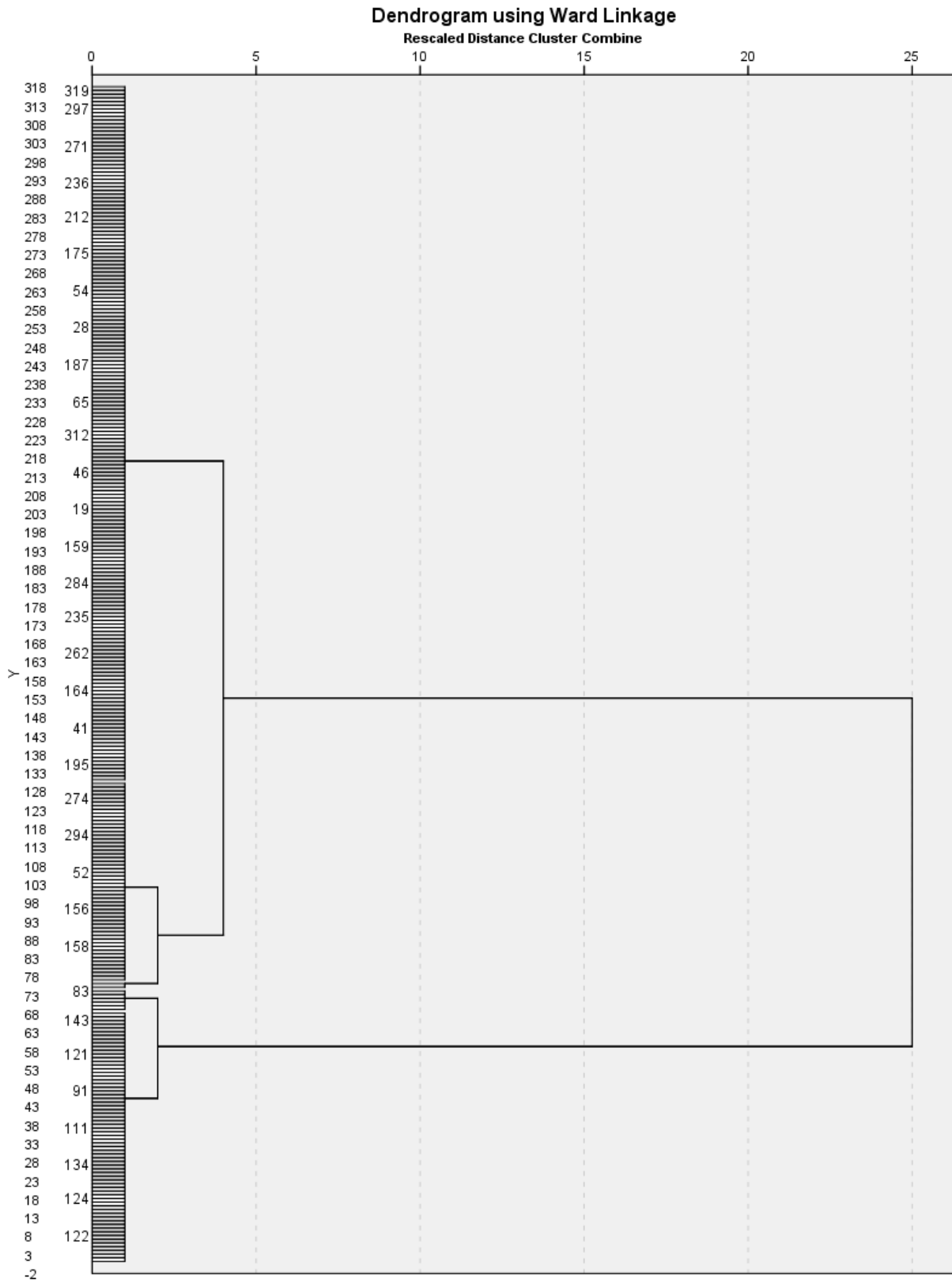
APPENDIX D – CROSSTABULATION TABLES

		Frequency x Amount -- Crosstabulation																
		<i>Frequency of MCA Purchases</i>																
		1	2	3	4	5	6	7	8	9	10	12	14	15	20	25	Total	
<i>Amount of MCA Purchases</i>	1	42	1	2	2	0	0	0	0	0	0	0	0	0	0	0	47	
	2	10	61	4	1	1	0	0	0	0	1	0	0	0	0	0	78	
	3	2	4	27	1	1	0	0	0	0	0	0	0	0	1	1	0	37
	4	3	3	4	19	1	0	0	0	1	0	1	0	0	0	0	0	32
	5	0	4	2	2	14	0	0	0	0	5	0	0	1	1	0	0	29
	6	0	0	1	7	2	8	0	0	0	0	0	0	0	0	0	0	18
	7	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
	8	0	1	1	2	6	0	1	0	0	0	1	0	0	0	0	0	12
	9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	10	1	1	0	1	8	1	1	0	0	16	0	0	0	0	0	0	29
	12	0	0	0	2	0	1	0	1	0	2	0	1	0	0	0	0	7
	14	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
	15	0	0	0	0	5	1	0	0	0	1	0	0	2	0	0	0	9
	16	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
	20	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1	0	4
	21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	23	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	25	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
	30	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
	50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2
Total		58	75	42	37	41	11	2	2	1	33	6	1	4	4	1	318	

Duration x Amount -- Crosstabulation																		
<i>Years since first MCA Purchase</i>																		<i>Total</i>
	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1	7	29	4	1	3	1	0	1	1	0	0	0	0	0	0	0	0	47
2	1	34	15	7	2	3	1	1	3	3	2	3	1	0	2	0	0	78
3	0	13	9	2	1	1	0	1	3	3	3	1	0	0	0	0	0	37
4	1	7	7	5	6	1	0	1	1	0	2	0	1	0	0	0	0	32
5	1	0	9	6	5	3	0	2	0	2	0	0	0	0	0	0	1	29
6	0	3	6	1	3	1	0	2	0	1	0	0	1	0	0	0	0	18
7	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	5	2	1	1	0	1	1	1	0	0	0	0	0	0	0	12
9	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<i>Amount of MCA Purchases</i> 10	0	1	3	2	7	3	2	0	0	8	1	1	0	1	0	0	0	29
12	0	0	0	1	2	1	0	0	1	2	0	0	0	0	0	0	0	7
14	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
15	0	2	0	0	3	0	0	0	0	1	0	1	0	0	0	0	2	9
16	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
20	0	0	1	0	2	0	0	0	0	0	1	0	0	0	0	1	0	5
21	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
25	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
30	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	3
50	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	10	91	60	29	36	17	5	11	11	23	10	6	3	1	3	3		319

Duration x Frequency -- Crosstabulation																		
																		<i>Total</i>
																		<i>Years since first MCA Purchase</i>
	<i><1</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>		<i>Total</i>
<i>1</i>	7	36	5	4	3	1	0	1	1	0	0	0	0	0	0	0	0	58
<i>2</i>	1	31	15	3	5	3	0	1	3	4	3	3	1	0	2	0	0	75
<i>3</i>	0	12	11	4	3	1	0	3	2	3	2	1	0	0	0	0	0	42
<i>4</i>	1	6	7	6	5	3	1	3	1	1	2	0	1	0	0	0	0	37
<i>5</i>	1	3	10	5	5	2	1	1	2	6	1	2	1	0	0	1	0	41
<i>6</i>	0	0	4	0	4	0	0	1	0	2	0	0	0	0	0	0	0	11
<i>7</i>	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
<i>8</i>	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
<i>9</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>10</i>	0	0	4	4	7	5	3	1	1	4	2	0	0	1	0	1	0	33
<i>12</i>	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	6
<i>14</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>15</i>	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	4
<i>20</i>	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	4
<i>25</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Total</i>	10	91	60	29	36	17	5	11	11	23	10	6	3	1	2	3	318	

APPENDIX E – CLUSTER ANALYSIS DENDROGRAM



APPENDIX F – FULL CORRELATION TABLE RESULTS

Variable¹	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<i>1-Freq</i>	-																				
<i>2-Amt</i>	.64***	-																			
<i>3-Duration</i>	.23***	.27***	-																		
<i>4-IPP</i>	-.08	.52***	.10	-																	
<i>5-Cluster</i>	.12*	.17**	.89***	.09	-																
<i>6-Mot</i>	.02	.07	.08	.04	.05	-															
<i>7-Sat</i>	-.08	-.06	.08	.01	.08	.74***	-														
<i>8-Edu</i>	.10	.08	.09	.04	-.01	.02	-.02	-													
<i>9-\$/yr</i>	.13*	.10	.12*	.00	.01	.01	.06	.34***	-												
<i>10-BMI</i>	-.03	-.06	.03	-.03	.03	-.02	-.03	-.11	-.08	-											
<i>11-EPA</i>	.08	.01	.01	-.05	-.01	.57***	.54***	.03	.10	-.07	-										
<i>12-EA</i>	-.10	-.10	.06	-.01	.07	.37***	.42***	.01	-.13*	-.01	.21***	-									
<i>13-SAB1</i>	.20***	.11	.09	-.02	.03	.12*	.07	.14*	.04	-.14*	.24***	.24***	-								
<i>14-SAB2</i>	.05	.01	.10	-.03	.09	.23***	.33***	-.01	-.09	-.12*	.27***	.44***	.51***	-							
<i>15-GSB</i>	.10	.07	.06	.05	.03	.24***	.26***	.15**	.05	-.16**	.27***	.52***	.67***	.60***	-						
<i>16-ITK</i>	-.05	-.10	.10	-.10	.14*	.15*	.18**	.04	.00	-.08	.17**	.14*	.07	.16**	.12*	-					
<i>17-% MCA</i>	.47***	.37***	.12*	.03	.08	-.05	-.12*	.04	.00	.01	.04	.00	.22***	.05	.14*	-.05	-				
<i>18-Age</i>	-.07	-.10	-.11*	-.04	-.05	.03	.16**	.02	.09	.04	.04	-.01	.02	.08	.08	.02	-.11*	-			
<i>19-Gender</i>	.09	.07	.00	.02	-.05	-.26***	-.21***	.08	.05	.02	-.13*	-.12*	.01	-.19**	-.06	-.16**	.16**	-.11*	-		
<i>20-6mos \$</i>	.24***	.16**	.14*	-.02	.03	.13*	.03	.14*	.19**	-.09	.11	.01	.19**	.05	.11	-.02	.12*	-.07	.01	-	
<i>21-6mos #</i>	.16**	.17**	.15*	.04	.18**	.21***	.16**	-.02	.11	-.01	.17**	.02	.09	.11	.10	.12*	-.07	-.10	-.08	.31***	-

Table Note. ¹. Freq. = Frequency of MCA purchase, Amt. = Amount of MCA items purchased, Dur. = Duration of MCA purchase behavior, IPP = MCA items per purchase, Mot. = Motivations for MCA purchase, Sat. = Satisfaction with the MCA product and customization experience, Edu. = Education level, \$/yr = Income, BMI = Body mass index, EPA = emotional product attachment, EA = environmental attitude, SAB1 = Pre-purchase sustainable apparel behaviors, SAB2 = Post-purchase sustainable apparel behaviors, GSB = General sustainable behaviors, ITK = Intention to Keep, % MCA = Percentage of MCA in Wardrobe, 6mos \$ = Six-month general apparel expenditures, 6mos # = Six-month general apparel items purchased; *p<0.05, **p<0.01, ***p<0.001 (2-tailed).