Radboud Universiteit

Climbing the Fashion Mountain; A study into the influence of consumer awareness on the environmental impact of fashion

Master Thesis (MAN-MTHBAM-2024)

Chapter 1: Introduction

In this day and age, nearly every global fashion brand releases a new collection each season, the overwhelming amount of new collections encourages consumers to purchase new items every season, leading to significant environmental concerns. For example, approximately 40% of the total clothing produced annually remains unsold in the US, contributing to excessive emissions and waste (Tonti, 2024). The fashion industry is responsible for 10% of global carbon emissions (Sharma, 2023). Furthermore, Bick et al. (2018) identified the fashion industry as the second-largest consumer of water globally, aggravating environmental deterioration. Additional harm arises from synthetic fibers used in fast fashion, which contaminate waterways (United Nations Environment Programme, 2022).

A literature review by Aponte et al. (2024) confirms the previously mentioned findings, revealing that in 2015, 92 million tons of textile waste were generated, with projections indicating an increase to 148 million tons by 2030. Much of this waste is either sent to landfills or exported to lower-income countries. Ertekin and Atik (2020) attribute these adverse environmental effects to the conflicting priorities of stakeholders within the fashion market. While large fast fashion retailers prioritize profit and growth, consumers seek affordable products to satisfy their purchasing needs. Consequently, the industry focuses on producing inexpensive, rapidly available fashion items, further increasing environmental damage. Addressing this issue requires consumer and producer-driven change, as sustainable fashion practices can foster healthier environments and mitigate climate change through improved design and production processes (Ulasewicz & Hethorn, 2023).

A review by Duong et al. (2024) highlights the growing importance of sustainable fashion as a response to environmental concerns within the industry. According to their findings, sustainable fashion uses biodegradable or recycled materials and upcycling techniques aimed at extending product lifecycles. These strategies reduce pollution, minimize plastic waste, and conserve natural resources.

As previously noted, most of the fashion industry operates on a fast fashion model to maximize revenue. In contrast, brands such as Patagonia and The Goodpeople emphasize sustainability by producing high-quality, long-lasting garments. These brands aim to shift consumer behavior towards purchasing durable products known as slow fashion. However, this approach often results in higher costs, presenting consumers with a dilemma: choosing between affordability and environmental responsibility.

Hur and Faragher-Siddall (2022) looked further into this interplay between financial factors and feelings of responsibility. They found that young consumers recognize

sustainability issues but are hindered by barriers such as high prices, skepticism towards green marketing, and limited access to sustainable options. Investigating the purchasing behaviors of young consumers in the Netherlands is particularly relevant, as young consumers tend to be more aware of sustainability concerns (Hur & Faragher-Siddall, 2022). Supporting this notion, McNeill and Moore (2015) discovered that the price premium associated with sustainable fashion serves as a significant barrier to adoption. Even consumers willing to make sustainable purchases may be discouraged by financial motives.

Beyond financial barriers, additional factors influence consumer behavior. For example, Ajzen's (1991) Theory of Planned Behavior (TPB) states that behavioral intentions are shaped by three key determinants: individual attitudes towards a behavior, perceived social pressure to engage in or abstain from the behavior, and perceived behavioral control. An extended version of TPB, developed by Brandão and Da Costa (2021), identified multiple factors affecting sustainable fashion consumption. Their study found that a lack of knowledge can hinder positive intentions towards sustainable fashion, while a high perceived value enhances consumers' confidence in their ability to purchase sustainable products. Furthermore, their findings indicate that willingness to pay a premium is linked to aesthetic appeal, meaning social pressures may encourage consumers to opt for higher-priced sustainable options. Additionally, research by Barbarossa and De Pelsmacker (2014) suggests that greater perceived availability facilitates sustainable consumption, while Manchiraju and Sadachar (2014) highlight the role of personal values in influencing ethical fashion choices.

In conclusion, consumer choices regarding sustainable fashion are influenced by multiple factors, including financial constraints and psychological elements outlined in the extended TPB model. Investigating how these elements assist sustainable behaviors is a crucial area of inquiry. The following section will explore prior research on strategies to encourage sustainable consumption within the fashion industry.

Several studies have examined the factors that motivate individuals to adopt sustainable fashion consumption habits. Ertekin et al. (2020) reviewed these studies and noted a gap in research on the role of governmental interventions in promoting sustainability within the fashion market. Hur and Faragher-Siddall (2022) were among the first to address this gap, finding that government policies, such as sustainability education, can incentivize young consumers to adopt sustainable purchasing behaviors in the UK. In their research, Hur and Faragher-Siddall (2022) considered sustainability education as creating awareness. The current study builds upon their recommendations by assessing the impact of consumer sustainability awareness on young consumers in the Netherlands. Moreover, Sohn et al.

(2021) investigated the environmental impact of consumer behavior by analyzing the life cycle of clothing items from production, transport, usage and disposal emphasizing the critical role of consumers in sustainability. Similarly, Scharioli et al. (2024) highlighted the growing significance of research in this area, documenting a steady increase in studies on sustainable fashion since 2007. Building on this foundation, the current study seeks to fill a knowledge gap by examining the environmental impact of consumer behavior, with a particular focus on consumer awareness and the life cycle of clothing during the use and disposal phases in the Netherlands. To investigate this research objective, the following research question will be addressed: **"How do consumer sustainability awareness and attitude influence the relationship between consumer behavior and the environmental impact of the fashion industry in the Netherlands?"**

Theoretical framework

Chapter 2: Slow/Fast fashion

The dominance of fast fashion is driven by rapid technological advancements and the continuous feeding of trend data into production. This has accelerated fashion consumption and reduced the shelf-life of garments to mere weeks (Sull & Turconi, 2008). This shift has altered consumer behavior, particularly among younger demographics (Morgan & Birtwistle, 2009). This demographic now prioritizes affordability and variety over durability and quality. This novel direction of fashion threatens the longevity of clothing. According to Morley et al. (2006), less durable clothing is produced, and the viability of the second-hand clothing market diminishes by the reduction of the price gap between new and old garments. In contrast, slow fashion presents a sustainable alternative by emphasizing local resources, transparent production systems, and distributed economies, thereby challenging existing hierarchies within the fashion industry (Clark, 2008). This approach not only fosters a deeper connection between consumers and their clothing but also integrates cultural heritage into contemporary fashion, enhancing both emotional and economic investment (Clark, 2008).

To achieve true sustainability in fashion, it is essential to consider various dimensions, including material sourcing, fabric treatment, production processes, resource conservation, and societal implications (Aakko & Koskennurmi-Sivonen, 2013). Luxury fashion brands hold the potential to bridge the gap between sustainability and high-quality craftsmanship, reinforcing the idea that ethical fashion does not have to compromise aesthetics or desirability (Joy et al., 2012). Moreover, a shift towards sustainability requires interventions across

multiple levels, engaging consumers and retailers to promote responsible production, purchasing, and disposal practices (Harris et al., 2015). Instead of merely balancing environmental, social, and economic priorities, sustainable development should prioritize human needs, social equity, and ecological boundaries (Holden et al., 2016).

Chapter 3: Consumer behavior

Consumer behavior in the fashion industry is shaped by a complex interplay of psychological, social, and economic factors, with self-expression playing a central role in purchasing decisions (Michaelidou & Dibb, 2006). By using reduced costs and media influence to generate a steady desire for new trends, the emergence of fast fashion has further stimulated consumerism (Claudio, 2007). Fashion innovators frequently participate in impulsive purchasing behaviors as a kind of self-gratification, especially those who are affected by media and celebrity culture (Scharioli et al., 2024). However, consumers who prioritize personal style over short-term fashion trends are more likely to adopt sustainable clothing consumption practices and dispose of their garments responsibly (Cho et al., 2015).

While price, quality, and style remain the primary determinants of clothing purchases, ethical considerations often take a secondary role, with only 30% of consumers ranking them as a key factor in decision-making (Iwanow et al., 2005). Nonetheless, raising awareness about the environmental impact of clothing has been identified as a crucial driver of sustainable fashion consumption (Claudio, 2007). Social factors are also important because peer pressure, environmental worries and personal guilt all influence consumers' desire to buy eco-friendly clothing (Cowan & Kinley, 2014). Even among eco-conscious consumers, economic factors and personal preferences remain dominant in their decision-making (Goworek et al., 2012).

The psychological mechanisms behind consumer behavior further highlight the challenges of fostering sustainable consumption. Fast fashion items' limited supply causes a loss aversion reaction, which promotes impulsive purchasing (Byun & Sternquist, 2012). Moreover, consumers develop their identities through external symbols, suggesting that ethical attitudes and values play a vital part in their interaction with sustainable fashion (Niinimäki, 2010). Emotional factors, such as compassion, have been found to positively influence sustainable consumption, whereas hedonistic values tend to discourage environmentally responsible behavior (Geiger & Keller, 2017; Pfattheicher et al., 2015).

Consequently, interventions promoting sustainability must acknowledge the importance of hedonic values in shaping attitudes and behaviors (Steg et al., 2012).

Consumer segmentation also reveals differences in sustainable purchasing behaviors. Fashion consumers can be categorized into three different groups such as Self, Social, and Sacrifice. Each group exhibits different attitudes towards ethical fashion (McNeill & Moore, 2015). Pioneers of sustainable fashion consumption often adopt strategies such as reducing their overall clothing purchases, avoiding traditional retail, and focusing on personal style as a means of bridging the gap between sustainability and fashion (Bly et al., 2015). However, despite generally positive attitudes towards sustainability, consumers frequently hesitate to purchase sustainable clothing due to perceived risks, concerns about greenwashing, and aesthetic uncertainties (Park & Lin, 2018; Rausch & Kopplin, 2020).

Encouraging sustainable fashion consumption may require not only increasing awareness but also addressing broader societal structures and norms. Changing the dominant social paradigm is essential to stimulating environmentally responsible behavior (Kilbourne et al., 2002). While small groups of consumers may already adhere to sustainable practices, the majority may feel constrained by existing consumption patterns and require targeted interventions to facilitate behavioral change (Harris et al., 2015). Understanding the underlying motivations and barriers to sustainable fashion is therefore critical for developing effective strategies that align economic, social, and environmental objectives.

Chapter 4: Measuring environmental impact of fashion industry

There are multiple ways to assess the impact of clothing on the environment, mainly Environmental Impact Assessment (EIA) and Life Cycle Assessment which were both compared by Tukker (2000) who highlighted their similarities and differences. According to Tukker (2000), the former (EIA) is more a procedure than a tool while the latter (LCA) is a tool which is useful within EIA. Furthermore, Tukker (2000) stated that the majority of the current literature who focused on fashion has used the LCA. Life Cycle Assessment (LCA) provides a comprehensive framework for evaluating the environmental impacts of fashion across all stages of a garment's life, from raw material extraction to end-of-life disposal which Sproles (1981) was one of the first to discuss. In the context of fashion, particularly with high-consumption items such as jeans and t-shirts, LCA reveals that the production phase is often the most environmentally burdensome due to the intensive use of water, energy, and chemicals in textile manufacturing (Finnveden et al., 2009). However, as demonstrated by

Sohn et al. (2021), the use phase, including washing and drying, can also contribute significantly to overall environmental impacts. Additionally, in a report by Levi Strauss (Levi's Jeans), their LCA showed that use of jeans by consumers contributes to 23% of the total water use in the whole life cycle of a pair of jeans. This variability underlines the importance of contextualizing environmental assessments by consumer behavior. Overall, LCA emerges as an indispensable tool for identifying the most impactful intervention points within the fashion industry's environmental footprint. To combine views of this and the previous chapter, the hypothesis is that higher consumer behavior results into a higher environmental impact of the consumer through fashion.

Chapter 5: Consumer awareness of sustainable fashion/laundry practices

Hur and Faragher-Siddall (2022) described that intervention in terms of education is essential to overcoming barriers to sustainable consumption, as voluntary measures alone have proven insufficient. Traceability is a key aspect of eco-labels in the UK's slow-fashion industry, valued by consumers for its role in sustainability (Henninger, 2015). However, evidence suggests that eco-labels are not primary tools for communicating sustainability information, as consumer engagement with labeling remains inconsistent. For instance, Iwanow et al. (2005) found that in Scotland, 39% of shoppers did not look at labels at all. Research by Holmlund et al. (2011) in Finland found that mature female consumers primarily checked care labels to avoid dry-cleaning rather than for sustainability concerns.

Moreover, despite awareness of recycling options, young consumers may still discard unwanted clothing, highlighting the need for early socialization into sustainable behaviors (Joung & Park-Poaps, 2011). Addressing these challenges requires a combination of interventions at multiple levels. Research suggests that compulsory eco-labeling, improved design and marketing, and clearer sustainability reporting benchmarks could enhance consumer engagement and awareness (Connell, 2010; Gonçalves & Suliva, 2021; Markkula & Moisander, 2012).

However, barriers to sustainable fashion consumption extend beyond information deficits. Internal factors such as low environmental concern, limited knowledge, and negative attitudes emphasize the importance of a shift in consumer behavior (McNeill & Moore, 2015). Furthermore, Connell (2010) stresses that external barriers like high prices and social norms, also imply a need for change in consumer behavior. Additionally, consumer uncertainty regarding product quality and durability contributes to the difficulty of assessment of

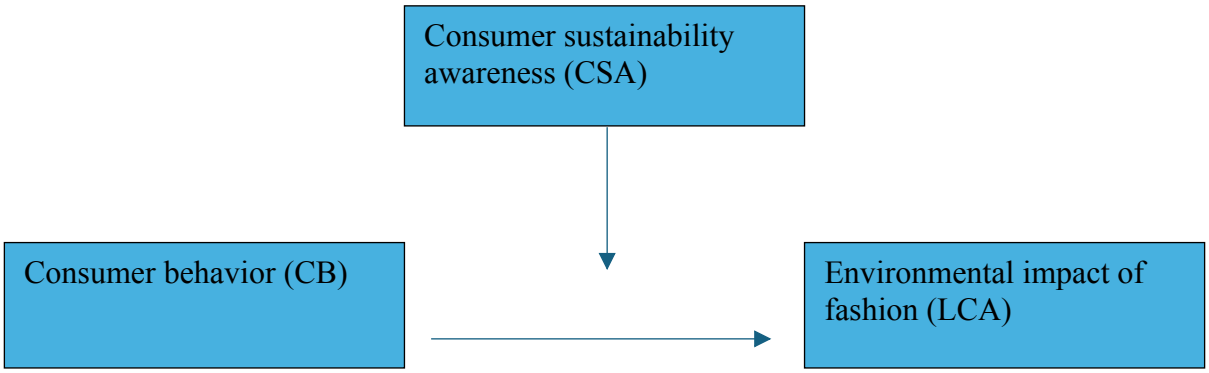
sustainability at the point of purchase (Goworek et al., 2012; Hassan et al., 2012). Therefore, fostering sustainable consumption in the fashion industry demands interventions such as policy regulations, industry accountability, and most importantly consumer education.

Moreover, to look into consumer education of sustainable fashion, laundry practices significantly influence the environmental impact of fashion, with sustainable washing methods playing a crucial role in the longevity of garments. Clothing care labels serve as essential guides, informing consumers about fabric composition and maintenance, thus facilitating sustainable laundering decisions (Maguire & Fahy, 2023). Laitala and Klepp (2020) indicate that adopting sustainable washing habits, such as using lower temperatures, co-washing programs, and lengthening the wear frequency before laundering, can significantly reduce energy and water consumption.

However, consumers often ignore these washing habits. For example, individuals are more likely to use hot water when washing odor-retentive fabrics, thereby increasing energy usage (McQueen et al., 2019). Sohn et al. (2021) show that a standard front-loading washing machine consumes approximately 75 liters of water per 8 kg load, underscoring the importance of optimizing washing habits to diminish environmental impact. Similarly, adjusting laundering routines such as washing at 30°C for example, can improve cleaning outcomes while simultaneously reducing the environmental harm (Laitala et al., 2011).

Likewise, reducing the frequency of laundering and selecting durable fibers contribute to more sustainable clothing preservation (Laitala et al., 2020). According to McQueen et al. (2017) excessive washing of denim accelerates fabric deterioration, including mass loss, color fading, and reduced tensile strength, displaying the urgency for consumers to reconsider their laundering practices in favor of more environmentally conscious behaviors. Therefore, shifting consumer habits towards more sustainable laundry and wearing practices suggests a feasible strategy for reducing the fashion industry's ecological footprint.

To conclude, sustainable practices of consumers rely heavily on their awareness of the impact of sustainable fashion. Solely, consumption of clothing does not address all environmental impact, laundry practices should also be included as they impact the life cycle of garments and therefore the frequency of fashion consumption. This insight steers the second hypothesis: high sustainability awareness and attitude will lower the effect of consumer behavior on the environmental impact of the consumer.



Chapter 6: Conceptual model

The conceptual models aims to explain that the relationship between consumer behavior and the environmental impact of the fashion industry may change depending on their attitude towards sustainability and the awareness of it. Consumer behavior, the independent variable, consists of the norms, values and financial reasons which drive consumers to act sustainably. Consumers acting sustainably includes deciding for slow or fast fashion consumption, opting more eco-friendly clothing and laundry practices. The environmental impact of the fashion industry is measured as all the effects that fashion consumption and fashion care have on the environment through the contribution of the consumer. Consumer sustainability awareness, the moderating variable, consists of values, beliefs and knowledge about sustainability within fashion and environment.

Chapter 7: Methodology

This study employed a quantitative research approach through the use of an online questionnaire on Qualtrics. The choice for a quantitative approach was deliberate as using standardized data collection and statistical analysis minimize subjectivity and bias. Results are based on numerical data increasing ease of comparison across different contexts (Field, 2018). It investigated consumer perspectives on sustainable and fast fashion, their consumer behavior and the environmental effects of fashion. The methodology focused on collecting, analyzing, and interpreting numerical data to identify patterns and relationships.

Chapter 8: Sampling and Data Collection

This study aimed to collect responses of at least 68 respondents with the use of an online questionnaire hosted on Qualtrics. An a priori power analysis was conducted using G*Power by Faul et al. (2007) which determined the minimum sample size required to test the study

hypothesis. To achieve 80% power for detecting a medium effect, at a significance criterion of $\alpha = .05$, was $N = 68$ for using linear multiple regression analysis. Thus, the obtained sample size of $N = 75$ was adequate to test the hypothesis as the post-hoc test showed a power of 84.5%. The responses were collected from a sample of young, Dutch consumers.

The choice of an online format was deliberate, as it considered the following advantages: the questionnaire could reach a geographically diverse sample across the Netherlands, which enhanced the representativeness of the findings (Hunter, 2012). Furthermore, the online format allowed rapid data collection from a larger number of respondents. Moreover, Hunter (2012) stated that anonymity encouraged honest and uninhibited answers. Finally, respondents could complete the questionnaire at their convenience, which potentially increased response rates through flexibility (Hunter, 2012).

The questionnaire has employed a snowball sampling technique that leveraged respondents' networks for wider distribution. The snowball effect was employed by distributing the questionnaire among the researchers' personal network and asking respondents to share it among their networks. This approach was expected to expand participation, particularly among diverse demographic groups, thus it enhanced the generalizability and external validity of the findings (Denscombe, 2012).

A diverse sample was integral to capturing a realistic representation of consumer preferences and behaviors across various segments of the population (Allmark, 2004). This diversity would have mitigated the risk of bias and would have ensured the findings were applicable to a broader audience. Furthermore, a study by Gwozdz et al. (2017) found that buying behavior of consumers depends on their social status. Therefore, a diverse social status sample would be a good representation of young consumers. Such inclusivity enhances the reliability and external validity of the research outcomes (Denscombe 2012), providing a nuanced understanding of the dynamics surrounding sustainable and fast fashion consumption. However, this diversity was not reached and is discussed further in the discussion section.

The research has utilized a structured questionnaire divided into four sections. Firstly, questions about demographics of respondents such as age, gender and income. Secondly, questions from research by Gwozdz et al. (2017) were used to gather information about respondents' consumer behavior which included buying behavior and laundry practices. The scope of the research was focused, only purchase and usage of t-shirts and jeans were taken into account as these are most commonly worn in the Netherlands (CBI, 2023; Statista, 2024). Thirdly, questions about respondents' knowledge of sustainability and views inquired about

their sustainable awareness and attitude. These questions were based on recommendations by Brandão and Da Costa (2021) and McNeil and Moore (2015) consisting of Likert-scale questions. However, only usage and disposal will be assessed to research the consumers' environmental impact. Environmental impact was measured based on the average water and energy use of jeans and t-shirts. Finally, a pre-test was conducted among 8 participants which tested the readability and diminished confusing questions, unclear wording and poorly designed formatting.

Chapter 9: Data Analysis

The collected data was analyzed using the statistical software IBM SPSS Statistics (Version 30). Descriptive statistics have summarized demographic characteristics and responses to each question, while inferential statistical techniques were employed to identify correlations and potential relationships between variables (Denscombe, 2012). Analysis was done, based on the conceptual model: independent variables Consumer behavior (CB), Consumer Sustainability Awareness (CSA) and the dependent variable Environmental impact of fashion (LCA), each variable construct was calculated on average scores. Based on analytical strategies from the book of Field (2018), the following analyses were conducted after removing data of respondents with unfinished questionnaires. Firstly, descriptive and frequencies statistics through calculating means, medians, modes, and standard deviations for each scale item and categorical item respectively. This gave an overview of the central tendencies and variability in responses. Secondly, Principal Axis Factoring was used to identify latent constructs for three key variables: CSA, CB, and LCA. Items with low loadings (< .30) or negative communalities were excluded. Thirdly, a reliability analysis was done, Cronbach's Alpha was computed to assess internal consistency. Fourthly, an ANOVA to compare responses between different demographic groups to see if there are significant differences in attitudes. Fifthly, a two-tailed correlation analysis was done to examine relationships between different Likert scale items or between demographic variables and attitudes, the research is exploratory therefore the two-tailed test was used. Finally, a regression analysis was done between the three main variables and a moderation analysis was conducted to examine whether CSA moderates the relationship between CB and LCA. All predictor variables were mean-centered prior to analysis to reduce multicollinearity and facilitate interpretation of the interaction term in line with Field (2018). The interaction term was calculated by multiplying the mean-centered independent variable (CB) with the mean-

centered moderator (CSA). The exploratory nature of the study will allow the examination of large-scale patterns and trends in consumer attitudes and behavior.

Chapter 10: Ethical Justification

This research adhered to ethical principles to ensure the protection of respondents' rights, privacy, and well-being. The following ethical considerations, based on Denscombe (2012), underpin the chosen methodology. Firstly, informed consent, participation in the study was entirely voluntary. Before completing the questionnaire, respondents were provided with a clear and comprehensive participant information sheet. This document outlined the purpose of the study, the nature of their participation, the type of data being collected, and how it will be used. Respondents were required to indicate their informed consent before proceeding with the survey. Secondly, anonymity and confidentiality, the online questionnaire format guaranteed respondents' anonymity, as no personally identifiable information was collected. Data was aggregated and stored securely. Access to the data was restricted to the researcher, ensuring confidentiality is upheld throughout the study. Thirdly, minimization of harm, the study's design minimized any potential discomfort or harm to respondents by focusing on non-sensitive topics such as fashion preferences and sustainability attitudes. Additionally, respondents could withdraw from the survey at any time without providing a reason. Fourthly, transparency and accountability, the research process was conducted transparently, with clear communication to respondents about how their data would contribute to the study. Findings were reported honestly and without bias. The use of standardized tools, such as SPSS for data analysis, ensured methodological rigor and accountability. Lastly, with respect for autonomy, respondents had the autonomy to decide when and where they completed the survey, and the option to pause or resume as needed. This flexibility respected their individual circumstances and fostered a more equitable data collection process.

By adhering to these ethical principles, this research ensures that the methodology respects respondents' rights, promotes inclusivity, and minimizes harm while maintaining the integrity and reliability of the study (Denscombe, 2012).

Chapter 11: Factor Analysis and reliability test

As this research was exploratory, Principal Axis Factoring was used to check communalities, loading of variables and how they were factored. For each variable, one factor was drawn separately. First step was to check the loading of items. The first factor was consumer sustainability awareness (CSA), loading for the items in this factor showed the following values. I buy clothes with environmentally friendly labeling (.745), I buy clothing with organic fibers (.602), I buy second-hand clothing (.349), I buy clothing with no dye processing (.710), I select clothing for cooler washing and shorter drying (.577), I avoid clothing products due to environmental concerns (.653), I buy recycled material clothes (.821), compared recycled to conventional item (.341), compared organic material to conventional item (.360). All other items were removed due to negative loading or empty loading.

The second factor entailed the volume of fashion consumption. Factor label was named consumer behavior (CB) and it consisted of the items: T-shirts bought in last three months (.838), Jeans bought (.826), Total number of clothing items bought (.782), Money spent on clothes (.549), how long do you keep jeans before discarding (.435) and how long do you keep T-shirts before discarding (.439). Several items were removed due empty loading: At which stores do you typically buy clothes, how many times do you wear an average jeans and how many times do you wear an average T-shirt.

The third factor was categorized for usage of clothing, possession of items and washing behavior. The label was called life cycle assessment (LCA) and consisted of the following items: At which temperature do you wash jeans (.858) and at which temperature do you wash T-shirts (.795). Empty loading items were removed such as how many jeans do you have in your wardrobe, how many T-shirts do you have in you wardrobe, how many times do you wear a T-shirt before washing, do you use the dryer after washing (all values and items can be found in the appendix).

Subsequently, variables were checked on their reliability. For CB an initial Cronbach's Alpha of .714 was found. After deleting the items how long do you keep jeans and how long do you keep T-shirts before discarding the value improved to .744 which was acceptable. Next variable, CSA, was tested on its consistency. Initial value of Cronbach's Alpha was .849, no improvements could be made and the value was acceptable. The last factor, LCA, was tested on a very low .065 which was insufficient. After first deleting the item 'how many times do you wear a pair of jeans before washing' Cronbach's Alpha improved greatly

to .810, which was acceptable for analysis. Subsequently composite scores of the constructs were calculated by using means of each item part of said construct.

Chapter 12: Composition of sample

Participants (N = 75) ranged in age from 19 to 41 years (M = 25.15, SD = 3.04). The sample consisted of 62.7% men, 36.0% women, and 1.3% who preferred not to disclose their gender, for the ANOVA analysis this sole case was excluded as it was not viewed as a group. Most participants were of Dutch nationality (92.0%). Regarding education, the majority held a bachelor's (36.0%) or master's degree (29.3%). Income levels varied, with 26.7% earning over €30,000 annually. English proficiency was generally high, with 62.7% reporting advanced fluency and 10.7% reporting native or bilingual proficiency.

Table 1
Descriptive statistics

Variable	Min	max	Mean	SD
Age	19	41	25.15	3.04

Table 2
Frequency statistics

Variable		Frequency	Percentage	Cumulative percentage
Nationality	Dutch	69	92	92.0
	Canadian	1	1.3	93.3
	Chinese	1	1.3	94.6
	German	1	1.3	95.9
	Hispanic American	1	1.3	97.3
	Iranian			
	Turkish	1	1.3	98.7
	Total	1	1.3	100.0
		75	100.0	

Gender	Male	47	62.7	62.7
	Female	27	36.0	98.7
	Prefer not to say	1	1.3	100.0
	Total	75	100.0	
Education level	High school degree	6	8.0	8.0
	MBO degree	6	8.0	16.0
	HBO degree	14	18.7	34.7
	Bachelor's degree	27	36.0	70.7
	Master's degree	22	29.3	100.0
	Total	75	100.0	
Last year's net income	0 – 4.000	15	20.0	20.0
	5.000 – 9.999	11	14.7	34.7
	10.000 – 19.999	15	20.0	54.7
	20.000 – 30.000	14	18.7	73.3
	More than 30.000	20	26.7	100.0
	Total	75	100.0	
English proficiency	Beginner	1	1.3	1.3
	Intermediate	19	25.3	26.7
	Advanced	47	62.7	89.3
	Native or bilingual	8	10.7	100.0
	Total	75	100.0	

Chapter 13: Results

Pearson correlation analysis showed a significant positive relationship between consumer sustainability awareness and LCA, r = .26, p = .012 (2-tailed). No significant relationships were found between CB and LCA (r = .11, p = .182), or between CB and CSA (r =-.10, p = .203).

One-way ANOVA's showed that gender significantly affected CB, F(1, 72) = 7.71, p = .007, income level significantly affected LCA, F(4, 70) = 2.68, p = .039. No significant effects were found for education level or age on any outcome variables (all p > .05).

A regression model predicting LCA was statistically significant, F(2, 72) = 3.36, p = .040 (2-tailed), explaining 8.5% of the variance (Rsquare = .085). CSA significantly predicted LCA, B = .057, β = .273, p = .018. CB was not a significant predictor, B = .014, β = .133, p = .244.

A moderation analysis was performed to test whether CSA moderates the relationship between CB and LCA. The interaction term was not statistically significant, B = –0.29, SE = 0.17, β = –0.19, t(73) = –1.69, p = .096, 95% CI [–.62, 0.05].

Table 2
Pearson correlations

Variable	**1**	**2**	**3**
1.Consumer sustainability awareness	1	-.100	.260**
2.Consumer behavior	-.100	1	.110
3.Life cycle assessment	.260**	.110	1

Note: ** = *p < 0,05.* Values in table are pearson correlations.

Table 3
ANOVA analysis

Independent	Dependent	Df between	Df within	F	p
Age	CSA	3	71	1.287	.286
	CB	3	71	.962	.416
	LCA	3	70	.269	.847
Gender	CSA	1	72	3.831	.054
	CB	1	72	7.710	.007**
	LCA	1	72	.513	.476
Education level	CSA	4	70	1.756	.147
	CB	4	70	2.430	.056
	LCA	4	70	1.177	.329
Income level	CSA	4	70	.155	.960
	CB	4	70	.979	.424
	LCA	4	70	2.676	.039**
English proficiency	CSA	3	71	1.328	.272
	CB	3	71	1.150	.335
	LCA	3	71	.885	.453

Note. CSA = Consumer Sustainability Awareness, CB = Consumer Behavior, LCA = Life Cycle Assessment .
** = $p < .05$

Table 4
Regression analysis and moderation analysis

Predictor	B	SE B	β	t	p	95% CI for B
(Constant)	6.483	.366	-	17.72	<.001	[5.754, 7.213]
CSA	.057	.024	.273	2.42	.018	[.010, .104]
CB	.014	.012	.133	1.18	.244	[-.010, .038]
Moderator	-.29	.17	-.19	-1.69	.96	[-.62, .05]

Note. CSA = Consumer Sustainability Awareness, CB = Consumer Behavior. Dependent variable Life Cycle Assessment.

Chapter 14: Conclusion

This study explored the influence of consumer behavior in the form of fashion consumption, sustainable consumer attitude on clothing use practices with a focus on their contribution to the environmental impact of fashion through an exploratory, quantitative research set-up. Both hypotheses were disproven, as consumer behavior, in terms of consumption volume, did not have a significant effect on use behavior. Furthermore, no significant moderation effect was found. The findings highlight that sustainable attitudes drive sustainable use behavior, supporting to role of psychological commitment in fostering more conscious clothing habits.

While consumer behavior (CB) did not directly predict sustainable use (LCA), significant demographic patterns, particularly in gender and income level, suggest that behavioral outcomes are shaped by broader social contexts. Data showed that female consumers buy more fashion than their male counterparts, while higher income showed less environmentally friendly clothing use. The non-significant moderation effect of consumer sustainability awareness suggests there are possible complex interplays between values and consumption practices that warrant deeper investigation.

In practical terms, the results emphasize the importance of fostering strong sustainability attitudes through education and social marketing, while also addressing structural and demographic barriers to sustainable consumption. For policymakers, retailers and educators, the findings provide valuable direction for designing targeted intervention that support both attitudinal and behavioral change in sustainable fashion consumption.

Overall, this research contributes to understanding how individual consumer traits and demographics shape sustainability behavior and offers pathways for reducing the fashion industry's environmental footprint through informing the consumer about their environmental impact through their consumption behavior.

Chapter 15: Discussion

The results suggested that consumer sustainbility awareness is an important predictor of the environmental impact of fashion, which was labeled LCA. This is consistent with the Theory of Planned Behavior (Ajzen, 1991), which posits that attitudes toward behavior are key determinants of behavioral intention and action. Consumers with stronger sustainability values are more likely to engage in behaviors such as wearing garments more frequently or for longer periods. This study supports prior research demonstrating that sustainability attitudes are predictive of pro-environmental behavior (Brandao & Da costa, 2021). Interventions aimed at strengthening attitudes may be an effective entry point for behavioral change.

Consumer behavior (in terms of consumption volume), in contrast, did not significantly predict LCA. This finding implies that how much a person buys is not necessarily related to how sustainably they use clothing. It reinforces the idea of an attitude-behavior gap, where individuals may intellectually support sustainability but still engage in unsustainable consumption due to social, habitual, financial or emotional drivers.

A moderation analysis examined whether consumer sustainability awareness moderated the relationship between consumer behavior and LCA. Although the interaction was not statistically significant, the direction of the coefficient suggests a potential trend: the positive influence of attitude on behavior might weaken as consumption increases. This could indicate that heavy consumers face more barriers in translating sustainability values into practice, possibly due to habits or lifestyle constraints. Furthermore, it could reflect a conflict between environmental concern and habitual overconsumption. The non-significant moderation effect suggested a possible trend worth exploring in future research, which will be discussed in the recommendations section.

Gender and income level showed effects on CB and LCA, respectively, suggesting that demographic factors play a role in sustainable fashion practices. These findings underscore the importance of considering demographic context in designing sustainability interventions. Tailoring messages and campaigns by gender and socioeconomic status could improve their effectiveness.

This study had a larger amount of male respondents (47) compared to female (27). Results showed that female respondents had a significantly higher consumption volume (CB) than females. Research by Workman and Cho (2012), showed similar findings. Furthermore, it was assumed that income level would have a significant effect on consumer behavior and the volume of consumption which is described by several studies (Bishnoi & Guru, 2023; Chi

et al., 2021), though these showed no significance. However, ANOVA analysis found that income level significantly impacted LCA which was not expected. A similar study by Gwodz et al. (2017) showed no significance between income level and LCA, which they called laundry practices in that study.

Initial factor analysis and reliability tests showed that the Cronbach's Alpha and communalities were too low to further analyze the data. First, an exploratory factor analysis was done to check how many factors were present. Scree plot showed five factors with an eigenvalue above one. Expected numbers of factors was three, therefore, a new method had to be introduced as the following reliability analysis did not provide sufficient Cronbach's Alpha values. Cronbach's Alpha values for consumer behavior, consumer sustainability awareness and LCA were .68, .80 and .29 respectively, these results can be found in the appendix. After some consideration, it was decided to cut of the factors in the exploratory factor analysis at one and tests were run for each variable separately. After deleting items with a negative loading or loading below .3, the improved group of items were tested on reliability. New Cronbach's Alpha values were all acceptable, however, there is one variable with an important side note which will be discussed in the limitations.

Finally, no analysis of mediation was deliberate. In order to test mediation, it is expected that the independent variable Consumer behavior would have a significant effect on the dependent variable LCA which was not found. Furthermore, consumer behavior should have a significant effect on the mediator consumer sustainability awareness, that was also not found. The mediator consumer sustainability awareness should have a significant effect on LCA which indeed was found. Two of the three assumptions to check for a mediation were not met, therefore there is no logical indirect pathway from the independent variable through the mediator into the dependent variable. Concluding, no mediation analysis was executed.

Chapter 16: Limitations

This study consists of a number of limitations that should be taken into account. Firstly, after restructuring the items to measure the variables, Life Cycle Assessment's items were adjusted. To improve its Cronbach's Alpha to an acceptable value, numerous items were removed. A satisfactory value was reached after two items were left. The use of a two-item scale to assess LCA is allowed for efficient data collection. However, it likely reduced internal consistency and limited the ability to capture the full scope of the construct.

Secondly, G-

power stated that N = 68 would be sufficient to rightfully conclude significant findings. However, it is important to consider that larger data sets will improve statistical power, standard errors shrink and facilitate finding significant relationships. In this study, moderation effect was close to significant (p = .096). Potentially, with a larger sample that same effect might have reached $p < 0.05$ due to reduced variability and higher power. Furthermore, a larger sample would have provided more accurate estimates of means, regression coefficients and correlations. It would have reduced the influence of outliers and anomalies, as far as present and confidence intervals would have become narrower, improving trust in the findings. Moreover, the sample of this research (N = 75) may not be entirely representative of the broader population, a larger more diverse sample could improve external validity. Additionally, the sample size might be to small to have done a moderation analysis. Small sample sizes create risk for models like moderation to be underpowered and misleading. This study had a non-significant interaction in the moderation analysis, which could be a Type II error (Field, 2018), also known as false negative, due to insufficient power. Thirdly, the total amount of respondents was 90 which included unfinished responses. Considering the amount full responses (75), this is a 16.7% portion that did not finish the questionnaire, reasons for this could be difficulty or length of the questionnaire. Fourthly, the majority of the sample was male (47) compared to female (28) which may limit the generalizability of the findings. ANOVA tests found significant gender effects, meaning men and women responded differently. As the sample has fewer women, the mean values for female responses are based on a smaller and less stable group, which may reduce reliability of between-group comparisons. Previous research has shown that gender plays a significant role in sustainability-related attitudes and behaviors, with women typically demonstrating higher engagement (Gazzola et al., 2020; Rahman & Koszewska, 2020). As such, the behavioral patterns observed in this study may under or overrepresent female perspectives and practices. Fifthly, the research relied on self-report measures, which can be a limitation in numerous ways. Through social desirability bias, respondents may have overreported socially approved behaviors (like recycling, sustainable use) and underreported unsustainable ones**.** This might be measuring what people think they do, not what they actually do. Through recall bias, people often struggle to accurately remember past behavior**,** for example, when asked to estimate frequencies (e.g., "How many times have you worn jeans?" or "How many items did you acquire in 3 months?"). This could result in measurement error and less reliable data. Moreover, respondents' perceptions of their behavior may not match their actual actions. For

example, people who occasionally shop second-hand might think they are acting sustainbly while they still engage in frequent fast fashion purchases.

Finally, this study has a relatively homogeneous sample as the respondents are predominantly Dutch (92%) while the student population in the Netherlands consists of many different nationalities which is a lot higher than in this sample. This limits the generalizability of the findings to broader Dutch, multicultural populations. Cultural norms and values significantly shape attitudes toward sustainability and fashion consumption (Lundblad & Davies, 2015). Therefore, the behaviors observed may not reflect those of consumers with different environmental norms, fashion systems or economic conditions through different nationalities.

Chapter 17: Recommendations

Building on these limitations, several recommendations can be proposed for future research and applied practice.

First, future studies should use improved, validated questionnaires. Specifically, the Life Cycle Assessment scale should be revised to include at least three or more well-developed items to capture a broader range of sustainable practices and ensure stable internal consistency. To diminish difficulty during factor analysis, the LCA scale should consists of solely Likert-Scale questions. Furthermore, measures for consumer behavior variables should also be refined for clarity and precision, as respondents showed some struggle with recalling their wardrobe and purchases.

Second, the questionnaire should be shortened or streamlined, as 16.7% of participants did not complete the full survey. Simplifying wording, reducing length and improving user experience can increase response rates and reduce amount of unfinished responses which is recommended by multiple other studies (Galesic & Bosnjak, 2009; Revilla & Ochoa, 2017). Consequently, this will have a positive effect on the next point.

Third, future research should include larger and more diverse samples. This would improve statistical power, allow for subgroup analysis and enhance the external validity of the findings. Balanced gender distribution is essential to better understand gender differences in sustainable behavior. Including participants from multiple nationalities would enable cross-cultural comparisons and highlight the influence of cultural values on consumer sustainability behavior.

Fourth, more accurate and objective behavioral data should be collected to complement self-reported measures. For example, this can include behavioral tracking, purchase logs, wardrobe inventories, or other observational methods. This can reduce the impact of bias and improve measurement validity.

Fifth, researchers should explore additional psychological moderators and mediators to understand the mechanisms behind sustainable behavior. This research showed a trend of moderation with no significance, therefore, other constructs such as environmental knowledge, identity, social norms, and perceived behavioral control could provide significance. These constructs may clarify how attitudes translate into action.

Sixth, this study focused solely on consumer behavior through shopping in general. Future studies should examine the role of fast fashion exposure, focusing on digital shopping habits in shaping sustainability behaviors. Moreover, the environmental impact of digital shopping, as delivery has a large impact on the environment (Jaller & Pawha, 2020). These factors may interact with sustainability attitudes in important ways and could inform both academic theory and practical interventions.

Finally, for applied practice, educators, marketers and policymakers should develop strategies that foster strong sustainability attitudes, while also addressing demographic and structural barriers to action. Tailored interventions, in particular, targeting women, high-income consumers, and habitual fast-fashion shoppers may be especially effective in bridging the attitude-behavior gap. These recommendations offer suggestions for improving future research quality and contributing to more impactful sustainability initiatives in the fashion industry.

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