



Consumerism and Waste in the Fashion Industry

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CONSUMERISM AND WASTE IN THE FASHION INDUSTRY

by

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Acknowledgments:

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Abstract:

The fashion industry is the second most polluting industry following the petroleum industry. While they pacify many consumers, second-hand stores do not greatly reduce the impact of how we consume fashion. The goal of this thesis was to offer a real solution to fashion waste to consumers.

During the literature review, I explored the ideas of consumerism, green consumerism, and the fashion industry. I explored attempts by other designers and artists to tackle the same issues. I explored the viability of modularity as a solution to waste, and I took trips to second-hand stores as well to investigate firsthand the types of clothing that end up there. What was discovered during these trips was that much of what we see at thrift shops is what I coined as instant waste: clothing that has no appeal outside of its original context. Examples of instant waste are commemorative shirts, uniforms, and fad chasing fast fashion.

This discovery led me away from tackling fashion waste indirectly with better fashion objects to a more direct approach of treating the waste as a resource that needed utilizing. My research led me to discover t-shirt yarn, which is a way to transform worn-out waste shirts into usable, stretchy, machine washable yarn. Through the process of making several shirts into yarn, I learned that the cutting of the yarn was the process in need of the most improvement. Any variation in the width of the strips caused the yarn to vary in thickness, causing the finished yarn to be hard to work with and making the final product noticeably uneven and ugly.

This brought me to prototyping and ideation. My initial inclination was that increasing the number of blades would perfect pre-spaced strips, but multi-blade cutters were too bulky and too difficult to ensure all strips would cut all the way through the first time. Instead, I switched to a roller design where the blade has a matching roller for it to pinch the fabric in between, and a series of geared linear rollers to lead the fabric to roll straight.

I developed this concept alongside the final form and arrived at my final design. Along with the rollers previously mentioned, it has several design features to aid in making optimal yarn. The tool featured toolless blade replacement and strip width changing. It is also made of clear plastic so you can observe the fabric as it pulls through the tool. Lastly, the main hinge features a removable pin that allows the top half to separate and be used as a rotary cutter.

Chapter I: Introduction

Background:

Consumerism is central to the practice of industrial design. We design consumer products at the will of corporations without much ability to care whether our design entirely aligns with our ideology, as we are never the only stakeholder. These stakeholders are necessary to the whole process and their goals, maximizing profits, having a sustained customer base, catering to customer wants, etc., are real-world constraints that have reasonable explanations for their existence. For many stakeholders, their main concern is making enough money to sustain the business, and doing so benefits everyone involved in some way. Asking to compromise profits for other ideals is a hard sell in an environment where companies go under daily. After all, there are many bankrupt but moral people and many morally bankrupt millionaires.

It should be clear by this point that I am fairly biased. As a designer and earthling, the protection of our environment is paramount to me. Morally we never should have let environmental damage become another externalized cost. Unfortunately, mother earth will get her pound of flesh for how we've treated her, but the worst offenders will be long dead. It's often said safety regulations are all written blood, the same can be said for environmental regulations but it's the blood of our kids and their kids. Pragmatically, it would be reckless to do anything but take authoritarian action against polluting companies. All that being said, I will leave as much of this bias out of my findings as I can to not cloud my vision.

Consumerism is here to stay, after all, we do need to consume. No one has enough time in the modern-day to have a part in producing all of the tools necessary to live. From cars to toothbrushes, the solutions we use nowadays for many of our problems have extremely complicated production. The what and how of what we consume is still up to designers like us, and with that comes an incredibly large amount of power.

Victor Papanek describes a concept called the Triad of Limitations, which are three things that determine and limit our experiences in life. It includes biological limitations, limitations of mortality, and limitations of habitat (Papanek, 2019). The limitations of habitat include the tools and buildings we used to live our life, as well as the ways we produce those tools. That side of the triangle is largely guided by designers. What that means unfortunately is that much of the damaging and wasteful consumption is driven by poor design. Better designs could lead to a less harmful choice architecture that empowers the consumers to make green decisions.

One concept that is useful to conscious designers is green consumerism. Green consumerism is a current movement to make consumerism less wasteful (Sachdeva et al., 2015). It is notable for being extremely accessible and acting as a gateway to more significant actions. While most people support green initiatives, studies have shown that at the same time many of them won't forgo price. There are several psychological phenomena at play motivating green consumerism. There are differences between private actions and public actions, mainly why they're taken and how it affects other actions the mass consumer takes.

Another important concept is the concept of technological nutrients and biological nutrients, which comes from the books *Cradle to cradle* and *the Upcycle* by Michael Braungart and William McDonough. "Technical nutrients are basically inorganic or synthetic materials manufactured by humans—such as plastics and metals—that can be used many times over without any loss in quality, staying in a continuous cycle. Biological nutrients and materials are organic materials that can decompose into the natural environment, soil, water, etc. without affecting it in a negative way, providing food for bacteria and microbiological life." Using this concept, designers can design to preserve the usability of these nutrients or use existing nutrient streams. The way products are produced, assembled, disassembled, and disposed of all affect the number of nutrients that can be recovered.

Lastly, there is the concept I coined instant waste. Instant waste is clothing that never stood a chance of being sold in a second-hand store. 90% of the clothes at second-hand stores are not sold locally, but only some of it is instant waste (Morgan, 2016). The key factor that makes certain clothes instant waste and others not is as follows: Instant waste is clothing that once removed from its original context no longer has any appeal. Commemorative shirts, work uniforms, and fad chasing fast fashion are all good examples of instant waste. Who needs a shirt commemorating a 5k they never attended? A red polo with the Target logo? Vintage (2 years old and falling apart) Zara dresses? Instant waste is one of the biggest creators of fashion waste, and most people who donate these garments never know that it ends up in a landfill most of the time.

Statement of research problem:

Consumption is necessary in our modern world, but it doesn't have to be as damaging as it is. How can we transition between our current consumerist ideology and consuming sustainably?

Questions:

The following questions will be used to guide my research:

- How can we “dispose” of excess fashion in a less damaging way?
- How can the clothes we already own become new?
- Can consumer behavior be changed to consume in a less damaging way?

Conceptual Research Framework:

The Conceptual Framework of my thesis consists of several major themes and their intersections. First and foremost are sustainability and waste. The fashion industry creates an immense amount of waste during production, and often within a few short years the final product

is waste itself. My research will deal with the latter portion of that waste. It will address how we currently deal with this type of waste, what it consists of, and how it can be reduced.

Next in my framework is Consumerism and more specifically Green Consumerism. I will investigate how we consume fashion, as well as why we consume what we consume. This research will touch on retail therapy as it does drive a portion of fashion consumption. Another part of my research will be investigating how we can reduce the impact of superfluous consumption through smart design choices.

The last area of my conceptual framework is fashion waste. Part of my research will be focused on the attitudes and trends that drive fashion waste. I plan on investigating newness and the other damaging ideas pursued as ideals in fashion that cause wasteful practices. I will also need to understand the fashion industry better from the perspective of the “fashionable” consumer.

Potential Users and Stakeholders:

Waste in a wide sense affects us all, but the true potential users for my thesis are only those directly concerned with textile waste. People who already take conscious action to reduce their environmental impact while still participating in regular society (they may recycle, compost, and use reusable bags at the grocery, but they shower regularly and eat meat).

As far as potential stakeholders there could be fashion brands if my thesis culminates in a fashion object or system. Potentially recycling services or second-hand stores could be stakeholders as well.

Preliminary Research:

Retail therapy is the psychological phenomenon that leads to often superfluous consumption (“Why Retail ‘Therapy’ Makes You Feel Happier,” 2021). Retail therapy is the act of

buying yourself something to boost your mood. Often the act of shopping in itself releases as much or more dopamine as receiving the product does.

Many marketing and business professionals follow an idea that came from cultural studies, called the ideology of consumerism (Lodziak, Conrad, 2002). The ideology of consumerism is the idea that consumerism gives Consumers meaningful experiences, and lasting happiness, and helps build self-identity. While meaningful experiences and lasting happiness can come from consumption, consumption is far from the only model for achieving them. Additionally, the identity consumerism helps you craft is a surface-level part of your identity: your style. Style doesn't happen in a vacuum either, it is influenced by outside factors uninvolved with consumer culture.

The fashion industry is the second most polluting industry, only lagging behind the oil industry. In the last 20 years, consumers have bought 400% more clothing. Additionally, many consumers feel better about their consumption because they donate to second-hand stores, but only 10% of donated clothes get sold locally (Morgan, 2016).

Anticipated outcomes:

My area of focus will be fashion as a case study on green consumerism and the psychological mechanisms involved in retail therapy. My goal will be to design a better way to consume fashion without constantly disposing of old garments. I plan on targeting donated clothing that doesn't sell at second-hand stores.

Chapter II: Design Research

Modularity:

One of my first thoughts for curbing waste was modularity. The base idea is that if one garment can fill multiple roles then suddenly you are consuming fewer garments in total. I researched what exists in the space of modular clothing and I did find a few interesting things.

Right off the bat, I found that there already were modular jackets. I knew modular pants existed but hadn't seen a modular jacket until I went searching. So I bought a jacket that could either be a long sleeve or a vest and started experimenting. First, I tried removing and attaching the arms while I was wearing them. I found that the zippers did not cooperate for either action and made the process clunky and unappealing. When I wore it out and was too warm I was much more likely to open the zipper halfway and create a vent rather than take the arm fully off. Partly this is because the zipper becomes hard to operate when you get to the back of the shoulder, but also the arms had nowhere to go once you removed them. You could stow them in the pockets, but I found that rendered them unusable and they often fell out accidentally.



Next, I experimented with styling the arms without removing them. I tried letting them dangle off my back like wings and found that it worked well but also it looked silly. Although while wearing this jacket I found myself actually wearing it this way fairly often because from a

usability standpoint it is solid. Occasionally when leaning over they would dangle in the way, but that issue was extremely minor. I also found that I could quickly put my arms back in the sleeves for whatever reasons with ease compared to removing them entirely.



My next attempt at styling was to try and 'wear' the arms while in vest mode. First I threw one on my head as a hat, and could immediately tell it wasn't going to be a fruitful venture. So I shifted to wrapping them around my neck as a scarf of sorts, which was much more successful. It looked intentional and fairly fashionable but as I continued wearing and testing the garment I came to an unfortunate conclusion: there is no situation where your neck is cold but your arms aren't. I only ever configured the garment this way for the spectacle, never because it was a good way to wear it.



Lastly, I looked into other high-end and artsy approaches to modular clothing. I found a project by Eleanor Chapman where she approached the same problem the same way but from an art angle instead of a design angle.

Research Trips:

A major component of my thesis is addressing the waste created indirectly by the fashion industry through the consumer. One of my strategies for doing that was visiting a wide variety of thrift shops, as this is where a majority of fashion waste ultimately ends up.

The main finding from these trips is what I'm going to call instant waste. Instant waste is any piece of clothing with an extremely narrow context where it makes sense. The most common example is the commemorative shirt. Whether it be for a family reunion, a charity 5k, or a marketing event, these shirts have several flaws. Often these shirts exist to make recipients walking advertisements for whatever event or group produced them, or they exist so the group leader can take a group photo with everyone in the same shirt. For a majority of the recipients of these garments never wanted the garment and will dispose of it immediately. At the end of these events the excess shirts are often donated, but to what end. How big is the market for people who want to appear as if they ran a charity 5k but truthfully didn't? That market shrinks further when you consider most of these commemorative shirts are uglier than sin and feature a back panel slathered in advertisements for all the sponsors of these events.

Another primary source of instant waste is work uniforms. Employees often have multiple sets of work clothes that become waste the moment they move on to another job. Some workplaces may have uniform return programs that prevent this waste, but those programs require two things most businesses lack: time and motivation. Firstly someone has to care about the waste, hunt down the ex-employee (the only person who possibly cares even less), wash/refurbish the garments, and repackage them for their next life. This is made an even

harder value proposition when you consider that most businesses have externalized the uniform cost already by having the employee 'buy' their uniform (Buy is in quotation marks because it is simply not optional. I buy a work uniform the same way I 'buy' the government by paying taxes). Convincing a fast food restaurant to adopt such a program might as well be impossible when most don't even recycle because having two waste streams is just too much work to manage.

T-Shirt Yarn:

As I progressed in my research there was a core dilemma: by focusing on fashion objects I was failing to successfully address the problem of waste. Fashion waste is created by several different waste streams, with some streams being more or less better avenues for change. Some fashion waste is the product of fads, chasing trends. Waste also comes from issues of durability, often stains and holes 'ruin' whole usable garments. Large amounts of fashion waste are instant waste as I mentioned earlier.

No fashion object can fully address the cycles of consumerism that lead to these waste streams. How long until a 'forever new' shirt is no longer in fashion? What happens when someone disposes of old clothes to buy sustainable wear? Realistically, we have all the textiles we could ever need, our treatment of it is the problem. This led me to begin researching what could be done with the waste. One of my findings was where they shred old jeans and use them as insulation ("The Benefits of Recycled Denim Insulation," n.d.). But I thought of how much suffering was needed to create those jeans in the first place.

I am the co-president of the University of Houston's Precious Plastic Club and have spent a lot of time processing waste. One of the things I learned quickly was that plastic containers that were intact still had life in them and could be infinitely useful for storage of all kinds. The same can be said for textiles. Shredding them all back to raw fibers was better than the landfill, but the value is lost. So I began searching for a way to lose less of that value in the

recycling process. What I found was Called T-shirt yarn. Essentially, when you cut shirts into strips and stretch the strips they roll in on themselves, forming a thick yarn that maintains all its original properties. T-shirt yarn is machine washable, durable, and flexible. The steps for making t-shirt yarn are as follows:

1. Rip the threads of your shirt
2. Flatten out the shirt and cut strips to 1" away from the edge of the t-shirt through both layers of the shirt
3. Unfold your shirt and lay the uncut portion of the shirt flat with none of the strips underneath that portion. Make diagonal cuts to make a continuous loop
4. Stretch the yarn until it doesn't stretch anymore



The current state of T-shirt yarn is that few people bother making it at all, and fewer still turn the whole shirt into yarn. In fact, while people like t-shirt yarn for its properties, some would rather buy factory-produced, virgin t-shirt yarn than go through the trouble of making it themselves. This is because it is a royal pain to produce successfully. In essence, t-shirt yarn is a raw material that makes its quality essential. Knitting or crocheting takes weeks of dedicated work alone, but if done with low-quality yarn it looks low quality.

Chapter III: Design Development

Rolling Cutters:

Through the process of making t-shirt yarn, I discovered several major issues with doing it by hand. First of all, by starting with the most accessible tools I found it to be a daunting and painful task. I started with a dull pair of scissors and a ruler. Cutting through two layers of t-shirt with dull scissors was slow, inaccurate, and caused my hand to cramp. It also created poor-quality yarn. What made it poor quality was a few things; firstly, the dull scissors caused the edges to be more frayed than they should have been. Secondly, the inconsistent thickness of the strips I cut caused the yarn to vary greatly in thickness once stretched. Thinner strips stretch more than thicker strips, so the problem is exponential. Portions of the yarn being so thin make it harder to work with and even after you manage to crochet/knit it the finished piece looks bad because of the extreme variation.

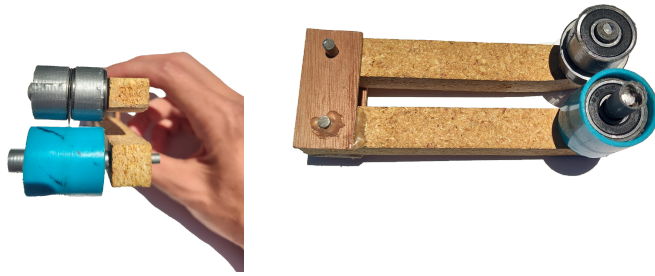


I ideated several different ways of solving this problem. The first solution was certainly a brute force solution; the strips couldn't be different thicknesses if we cut them all at the same time with perfectly spaced blades. Taking inspiration from rolling pins, I designed a multi-blade rotary cutter that would accomplish this task. Unfortunately, this solution had major issues.



While a multi-blade cutter seems great, after a few attempts it became clear the idea had its flaws. The biggest issue with multi-blade designs is fully cutting all the way through on every strip. Cutting through multiple layers with a rotary cutter requires good contact with the cutting mat. When working with as few as three blades, any flex in the main axis rod causes one or more of the blades to not make enough contact to cut through the shirt. The next flaw with these designs is that making straight cuts was a real challenge. Any mistake made by the user was now multiplied across multiple strips at once. Additionally, having essentially a rolling pin with blades on it was unwieldy and dangerous, as well as expensive and bulky.

With that dead end, I switched to a single-blade approach with the same goal in mind: cutting perfect strips every time. I was inspired by the flywheels on electric nerf guns. They have two wheels spinning in opposite directions close together, and when a dart is shoved into them the wheels grip the dart, accelerate it and launch it out the barrel in a straight line. So for my next prototype, I made two wheels, one with a blade in the middle and one with a hard plastic surface to keep the blade sharp and provide a good surface for the cutting.



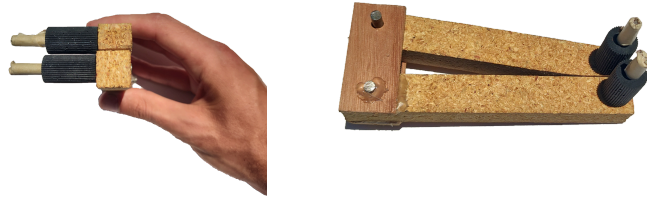
While easy to cut with, making it cut straight was not so easy. The cloth had to be pulled through the cutter with one hand while the other hand held the cutter. While this body position is comfortable, pulling the fabric straight through the wheels is not easy. Most cuts came out crooked within an inch because nothing kept the fabric rolling linearly.



Linear Rollers:

A friend recommended I look into roller-feed sewing machines. While most sewing machines feed the fabric with a toothed 'foot' that pushes the fabric forward. What differentiates roller feed sewing machines is they use a knurled roller that feeds the fabric. These rollers, when used on home machines, are used to increase the ability of the sewing machines to sew better curves. The roller feed sewing machines that interested me the most were industrial models used to sew repetitive straight stitches. The roller feed was much wider, with gear-like teeth only going parallel to the axis of the roller.

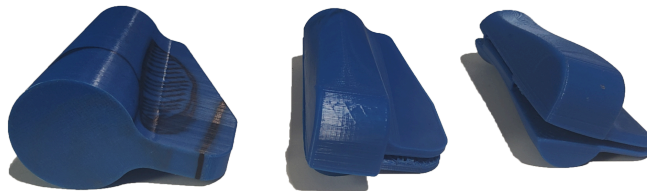
I 3D modeled and printed them to test whether this concept would work for my design. My testing showed that they significantly improved my ability to make straight cuts with the prototype.



Form Development:

Once I began focusing on t-shirt yarn-making tools as a direction. While initially I was inspired by things like a can opener and staplers the biggest shift happened when it was suggested I change the hinge. In my mechanical prototypes seen above the hinge is at the back of the form going perpendicular to the fabric moving through it. My professor suggested that the hinge should be parallel with the fabric so its movement would mimic the hand itself.

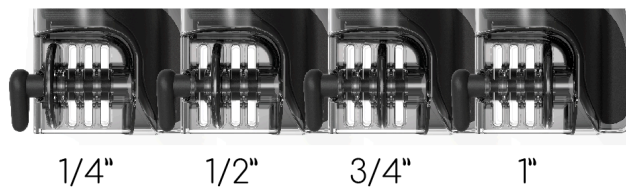
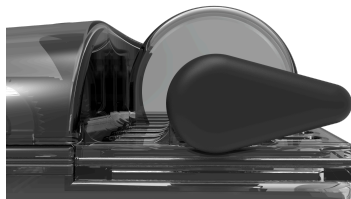
After this change was made it became clear that something was needed to prevent the user's fingers from completely wrapping around the tool and grabbing the fabric. A 'wing' was added for their fingers to rest on. Next, I began 3D printing rough size models to make sure the tool fits well in the hand.



Chapter IV: Design Solution



My final design solution is named Respin, and it has several features that help it be an ideal tool for cutting and making t-shirt yarn. It uses standard 28mm rotary cutter blades, and the blade can be changed without any tools by rotating and removing the pin up front. Once you remove the pin the blade and the blade cover slide out, and you can either change the blade or strip size by inserting the new blade and blade cover into any of the available slots. Strips can be cut in 1/4", 1/2", 3/4", or 1" sizes, allowing you to adapt the strip size to the specific fabric.

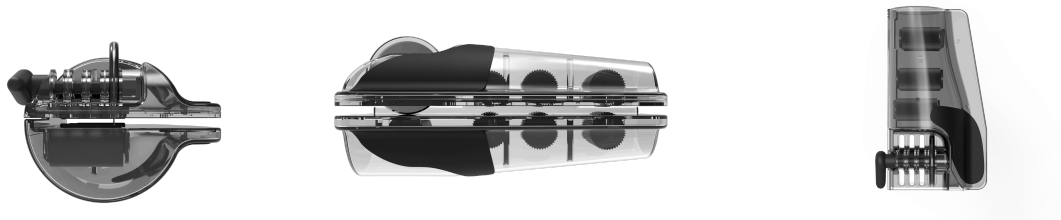


Respin has a hinge on its right side which allows you to open the cutter and line up your shirt perfectly. The pin for the hinge is also removable so the top half can be used as a stand-alone rotary cutter and is meant to be used in conjunction with a cutting mat. That's so the

user can use it to cut the diagonal cuts needed to make continuous t-shirt yarn. Respin has two sets of linear rollers that grip the fabric and keep it rolling straight as it cuts.



It also features a rubber overmolding that falls right under your fingertips when gripping the tool in your hand, even for left-handed users. Respin's winged shape keeps your fingers out of the way of fabric as it moves through the tool. Its clear shell lets the user see the fabric move through the tool to ensure a perfect cut every time.



Chapter V: Summary

Fashion waste is a massive issue that does not have a single solution. Tackling this multifaceted issue is too much for one thesis. Respin provides one route to tackle one waste stream. Instant waste has no value as clothing, but as yarn, it has value again. Respin gives garments a second life that they wouldn't have otherwise.

Bibliography:

Lodziak, Conrad. (2002). *The Myth of Consumerism*.

Morgan, A. (2016, January 21). *The True Cost: Secrets Behind Fashion Industry*.

<https://www.youtube.com/watch?v=0wB2SS1GC3M>

Papanek, V. (2019). *Design for the Real World* (3rd ed.). THAMES HUDSON.

Sachdeva, S., Jordan, J., & Mazar, N. (2015). Green consumerism: Moral motivations to a sustainable future. *Science Direct, Current Opinion in Psychology*(6), 60–65.

The Benefits of Recycled Denim Insulation. (n.d.). *HGTV*.

<https://www.hgtv.com/design/remodel/mechanical-systems/the-benefits-of-recycled-denim-insulation>

Why Retail “Therapy” Makes You Feel Happier. (2021). *Cleveland Clinic*.

<https://health.clevelandclinic.org/retail-therapy-shopping-compulsion/>