

Spring 5-1-2021

## Changing Fashion: An Analysis of Social Media Activism Targeting the Fashion Industry

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### Recommended Citation

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CHANGING FASHION

**Changing Fashion: An Analysis of Social Media Activism Targeting the Fashion Industry**

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## CHANGING FASHION

### CHANGING FASHION: AN ANALYSIS OF SOCIAL MEDIA ACTIVISM TARGETING THE FASHION INDUSTRY

The fashion industry is a primary contributor to the climate crisis. Fast fashion in particular has accelerated the industry's harm to the environment by encouraging exceedingly fast production, greater consumption, and the disposability of clothing. It also has social impacts - the working conditions of and wages paid to garment workers consistently endanger their health and well-being, as well as the well-being of their families. Industry-wide changes are needed to solve these environmental and social issues. Collective action plays a crucial role in movements pursuing large-scale change. The environmental movement would benefit greatly from a focus on collective action, but much of the online activism in this movement does not have this as its primary focus. Greenwashing has been a negative development in response to increased social consciousness of the climate crisis. Despite recent environmentally-minded innovation in the fashion industry, including the development of sustainable fibers and green certifications, much more extensive change is needed. A more pronounced online strategy for mobilizing nonactivists to collective action would help build the political power needed to necessitate these changes.

Keywords: Collective action, mobilization, social media, environmentalism, fashion industry, greenwashing

## CHANGING FASHION

### Changing Fashion: An Analysis of Social Media Activism Targeting the Fashion Industry

The world we know today has been formed and informed by the activism of the past. The Civil Rights Movement, anti-war protests surrounding the Vietnam War, and the more recent #MeToo movement, to name just a few of the high profile activist causes of the past century, have all shaped the social environment of today. A cause with a growing group of activists championing it in this new decade is the natural environment. Concern about climate change stretches back to at least 1962, the year Rachel Carson published *Silent Spring* (American Archive of Public Broadcasting). Since this publication, the modern environmental movement has evolved and expanded. In 1972, the United Nations held the First Earth Summit and in 1988 it established the Intergovernmental Panel on Climate Change. International agreements on curbing carbon emissions and other environmental impacts have been reached, including the Montreal Protocol in 1989 and the Kyoto Protocol in 1998 (Jackson n.d.). While the Montreal Protocol was successful in cutting the production of chlorofluorocarbons, the Kyoto Protocol has not been successful in slowing the rise of global temperatures and efforts to reduce the effects of anthropogenic climate change remain top of mind for many activists and policymakers today (McKenzie et al. 2019; Hunt 2012).

Climate change is an expansive issue and halting its impact necessitates changes in nearly all human activity. From our modes of transportation to the food we eat, human behavior is threatening the livability of the planet in the decades to come. Contributing to this threat is consumerism, a preoccupation with and inclination toward the buying of consumer goods (Merriam-Webster). Under the current global capitalist system, consumption, particularly that of affluent individuals and communities, has increased since World War II (Wiedmann et al. 2020). Higher employment rates and industrialization led to an increase in clothing consumption of

## CHANGING FASHION

10-15% during the war years alone, and clothing consumption has continued to expand since (Claudio 2007:a451). This increase has further strained the environment and hastened humanity's use of the limited natural resources available to us (Wiedmann et al. 2020). The growth of the fashion industry perhaps best exemplifies affluent society's increasing consumption and damage to the planet. In 2000, approximately 50 billion new garments were produced (The World Bank 2019). As of 2018, annual clothing production had increased to 80 billion items per year (more than ten times the global population), and, in the United States, approximately 80 pounds of textile waste per person was produced annually (Bick, Halsey, & Ekenga 2018:1). This attitude of disposability and accelerated consumption ultimately results in pollution, environmental injustice, and an amplification of climate change.

The purpose of this thesis is to make two arguments. First, I will argue that fashion is a significant contributor to the ongoing environmental crisis. The negative social and environmental outcomes of the industry will be identified here. Second, I will argue that social media is a valuable tool for activism, specifically in the context of the environmental movement. This second argument will be supported by a foundation of collective action and mobilization theory as well as a critical analysis of Instagram accounts. The argument for the importance of collective action in the environmental movement will be drawn from Leonard (Leonard 2013). Theory about mobilization technologies in general will be drawn from Oliver and Marwell, and evidence of the role of digital technologies in 21st century movements will be drawn from Turner (Oliver & Marwell 1992; Turner 2013). The critical analysis will provide insight into activists' success (or lack thereof) in mobilizing nonactivists to participate in the environmental cause. Special attention will be paid to whether their focus is on individual change or collective action. Lastly, changes in the fashion industry, both positive and negative, that have resulted

## CHANGING FASHION

from heightened social consciousness will be identified.

My goal is that this argument illuminates the ways in which the fashion industry's current model negatively impacts the environment. I also hope to identify social media's potential as a mass mobilization tool for activism. While the climate crisis is more urgent than ever, knowledge about the ways we can change to soften its impact is also more available than ever. Ignoring the problem will never make it go away, but using the information available to us may improve our collective future.

## THEORY

Collective action is crucial to the success of any movement. In the case of the environmental movement, however, the focus has often been on individual action (Leonard 2013:244). While effective at assuaging individual eco-guilt, this distracts from demanding change from the real drivers of climate change. Consider waste production: 76% of all U.S. waste comes from industry, while only 3% comes from households (Leonard 2013:247). Encouraging recycling and less single-use plastic is good, but it can end up placing the burden on the wrong party. To effect real change, new policies and laws need to be introduced, and cultural norms and technologies need to be updated (Leonard 2013:248). Demanding these societal updates requires political power built via collective action - from signing petitions, writing emails to elected officials, and publishing articles, to forming organizations or running for office (Leonard 2013:248).

In this digital age, social media is a valuable tool in mobilizing individuals to take this collective action. Applying Oliver and Marwell's theory of mobilizing technologies illustrates the ways in which social media is beneficial to mobilization (Oliver & Marwell 1992). In their theory, activists use mobilization technologies to convince nonactivists to participate in their

## CHANGING FASHION

cause (Oliver & Marwell 1992:251). Mobilization technologies are “sets of knowledge about ways of accumulating resources (such as time and money) necessary for production technologies” (Oliver & Marwell 1992:255). Oliver & Marwell define an activist as someone who is “prepared to incur significant costs” in the pursuit of some goal. They also define three categories of nonactivists: those with zero probability of contributing to the cause, those with a low probability of contributing, and those with a high probability of contributing (although not absolute probability). The low probability and high probability groups are differentiated by their identification with the goal. Low probability nonactivists support the goal but do not identify strongly with it, while high probability nonactivists attach a significant positive value to the goal (Oliver & Marwell 1992:253-254). Activists are plagued by insufficient information about the population for differentiating between the groups of nonactivists, as well as uncertainty about which high probability contributors will actually contribute (Oliver & Marwell 1992:254).

Social media can alleviate, at least in part, some of this uncertainty. An environmental activist with a following on Instagram, for example, knows that the individuals that follow her are at least invested enough to engage with the environmental content she produces on the platform. Since zero probability nonactivists are either against environmentalism (in this case) or indifferent to it, they likely would not follow an environmental Instagram account and/or view its content. Thus, environmental activists can consider all of their followers either low probability or high probability nonactivists. This knowledge allows them to target nonactivists with at least some chance of contributing to the cause, and prevents them from wasting effort and resources on recruiting zero probability nonactivists. A deeper dive into their engagement analytics can further differentiate between these two groups; followers that regularly comment, like, and share the content may be considered high probability, while those that only view and occasionally

## CHANGING FASHION

interact with the content may be considered low probability. Activists can then further focus their efforts on the high probability nonactivists, allowing for more efficient use of resources.

Activists primarily recruit time contributions, as time is considered the ultimate resource for collective action (Oliver & Marwell 1992:257). Many types of collective action are best done by many people, including marches, petition signing, and voting, so activists attempt to persuade as many nonactivists to participate in their cause as possible (Oliver & Marwell 1992:258). Time contributions can come in the form of limited requests - well-defined events and jobs that have a designated time contribution - or open requests - undefined continual contributions with no designated "end point." Typically, nonactivists are more responsive to limited requests because there is less perceived cost associated with the commitment (Oliver & Marwell 1992:265-266). Of the two types, social media is best suited for limited requests. The online format is good for sharing petition links, starting email campaigns to elected officials, and urging participation in one-time in-person demonstrations.

Activists can request time contributions directly, via explicit requests to individuals or groups, and indirectly, via events whose existence invites their participation. When requesting contributions directly, activists can use three different strategies. The first of these strategies is via unselective communication with all available nonactivists. Requests of this nature are usually for commitments no greater than signing a petition. The next strategy is contacting personal acquaintances and other known high-probability contributors. These requests can be for larger commitments, because the individuals being asked are more likely to commit. The last strategy Oliver and Marwell note is "federated mobilization." In this strategy, activists communicate a request to the members of an existing organization through that organization's leader. This method is typically used to recruit large numbers of nonactivists for marches and demonstrations



## CHANGING FASHION

(Oliver & Marwell 1992:266-267). All three forms of requests can be completed online. For example, general posts on Instagram will reach all available nonactivists, while direct messages to followers with a history of engagement targets high probability nonactivists. Additionally, the activists behind large Instagram accounts can be viewed as the leader of an “organization,” so activists behind small accounts can request contributions through them to reach a broader audience.

The primary limitation of time mobilization is transcending existing social networks (Oliver & Marwell 1992:267-268). Most time mobilization involves requesting participation from individuals already known to the activist. This limits the possible number of participants as well as a movement’s growth potential. Activists can try to break this constraint by communicating via a mass medium, but this usually fails to attract new participants due to low credibility (Oliver & Marwell 1992:268). As a global mass medium, social media allows activists to reach essentially unlimited audiences. When used effectively, social media can amplify movement growth and the impact of collective action by reaching outside of existing social networks.

Recent history has demonstrated social media’s ability to foster movements and advance collective action (Turner 2013:376). Turner discusses the Occupy Wall Street, Grillini, and 15M Movements as case studies in the Internet’s effectiveness as a mobilization tool (2013:377). In these movements, the Internet was used to spread information directly to the masses, nationally and internationally, and fostered offline action (Turner 2013:378). In line with mobilization theory, the Internet provides low cost means of fast communication with and mobilization of large groups (Turner 2013:379). Social networking sites in particular have been vital to the success of 21st century movements because of their global reach (Turner 2013:279).

## CHANGING FASHION

### METHODOLOGY

In an effort to understand the way the fashion-focused environmental movement utilizes social media, a qualitative analysis of twenty Instagram accounts will be completed. The primary focus will be on ten accounts focused on environmental issues within the fashion industry specifically. The imagery and textual content of 50 posts per account (500 posts total) will be assessed to determine whether the post encourages collective action, individual action, or has no call to action. Given the power of collective action, this will inform an argument about whether the fashion sector of the environmental movement is using social media as an effective mobilizing tool. Number of followers per account, as well as the number of likes and comments per post, will also be noted to determine how nonactivists interact with each account.

Ten general environmental accounts will also be analyzed in this same manner, and the findings of each group of accounts will be compared. Again, the textual and visual content of 50 posts from ten accounts, for a total of 500 posts, will be analyzed. This information will be used to determine if the fashion sector of the movement differs in its goals from the environmental movement overall. If differences are evident, this may have implications for the sector's (and movement's) success.

Instagram was selected as the social media platform for this analysis because of the multi-faceted data it hosts. The requirement of a picture or video in every post provides context for the textual content as well as valuable information on its own (Laestadius 2018:4).

“Infographics” are a popular type of visual content on Instagram, especially with activist accounts, where graphic design and other imagery is used to make educational information more appealing and easily digestible for the consumer. Visual analysis of these and other posts deepens our understanding of activists' social media activity and goals.

## CHANGING FASHION

A total sample size of 1,000 posts and 20 accounts was selected to balance the depth and breadth of data. A sizable sample was needed to draw conclusions about the behavior of environmental activists online, not only about the accounts under study. However, the sample size also needed to be manageable, to ensure a holistic interpretation of the data. Because this analysis is drawing conclusions about a subset of Instagram users, not the entire population of users, balancing these two needs is possible (Laestadius 2018:10). Examples of successful research utilizing a similar study framework include analyses by Carah and Shaul (2016), Marwick (2015), and Gibbs et al. (2015) (Laestadius 2018:10).

The eco-fashion accounts analyzed were chosen via a manual search within the Instagram app. Searching the keyword “sustainable” was successful in bringing up multiple accounts for analysis. Additionally, one of the accounts analyzed, @the\_rogue\_essentials, provided a list of quality fashion-focused environmental accounts. The accounts she provided that were included in the final analysis are: @ajabarber, @sustainableoutfits, @acteevism, @marielle.elizabeth, and @aditimayer. The general environmental accounts were found using a snowball technique - one environmental account was found via search, and then its “following” list was scanned for another applicable account. This was used to find all ten general environmental accounts analyzed.

Analysis began with an informal analysis stage. I familiarized myself with the themes and content of the 1,000 post sample by reading through each post’s caption and viewing its visual content. Once all 1,000 posts were read, the formal analysis took place. The likes, comments, and type of call to action (collective, individual, or none) was tracked for each post. Differences in consumer engagement and account goals for mobilization were discovered using this raw data as well as averages. The statistical significance of these differences was tested using t-tests.

## CHANGING FASHION

### FASHION'S ENVIRONMENTAL IMPACT: A BRIEF OVERVIEW

The fashion industry - every business involved in the selling of clothes, from designing to promotion - is a multi-billion dollar business. It has evolved from an industry of entirely handmade (usually homemade) products in the 19th century to one of standardization and mass production. This development is due to technological advancements, like the creation of the sewing machine, as well as the rise of the factory system and globalization. These innovations have enabled the industry to source textiles, assemble goods, and sell finished products in different countries along widespread supply chains. Every step in the supply chain is designed to result in increased production, and profits, for the company (Steele & Major n.d.).

Fast fashion, a phrase used to refer to inexpensive, readily available garments intended to reflect the latest styles, is a recent development in the fashion industry (Bick et al. 2018:1). Enabled in part by the Internet and the creation of trends, it relies on the consumers' constant desire for new items and exceedingly fast production to meet this desire, as well as cheap retail prices and even cheaper production costs (Smith 2021). Brands benefit from selling cheap clothing in enormous quantities, so fast fashion has become a dominant model within the industry. With the rise of the fast fashion model, clothing consumption has skyrocketed. Eighty billion new garments are purchased every year and, in the U.S., 85% of the clothing consumed each year is also sent to landfills (Bick et al. 2018:1). Americans are consuming and disposing of clothing at a pace never seen before, thanks to the affordability of fast fashion.

While some see fast fashion as a positive development (in this view, fast fashion eliminates elitism in fashion and makes the latest styles available to all), the model has immense social and environmental impacts (Bick et al. 2018). Fast fashion is predicated on low production costs. For this reason, fast fashion is almost entirely produced in low or middle income countries

## CHANGING FASHION

(LMIC), where labor costs are low and safety standards often go unenforced (Bick et al. 2018:2). As a LMIC, China is fast fashion's primary exporter, and exports 30% of all world apparel exports. The low labor costs in China and other countries are due to unethical working conditions in addition to extremely low wages (Claudio 2007:a450). On average, garment workers in Asia are paid 2-5 times less than the Asia Floor Wage, a living wage formula calculated by an alliance of Asian trade unions and labor groups (Clean Clothes Campaign). However, non-living wages are paid to garment workers in other parts of the world as well, including Eastern Europe. Workers paid less than a living wage cannot adequately provide for their families, secure sufficient housing or food, obtain a satisfactory education for their children, or save for the future (Clean Clothes Campaign).

The unethical conditions garment workers are subjected to put them at risk for a number of injuries and diseases. Air pollution in the form of cotton dust and synthetic air particles combined with poor ventilation pose respiratory hazards, and repetitive motions as well as a lack of ergonomic equipment often cause injuries. Lung disease and cancer, endocrine dysfunction, poor reproductive and fetal outcomes, as well as overuse injuries have all been reported in garment workers (Bick et al. 2018:2). In risking the health of their employees, companies are consistently choosing profits over people.

Clothing companies also consistently choose profits over the planet. The fashion industry accounts for 10% of all global carbon emissions, second only to oil; this number is expected to increase by more than 50% by 2030 as production and distribution continue to pick up speed. Fast fashion alone produces 1.2 billion tons of carbon. Excessive water use is another environmental impact fashion is responsible for - about 93 billion cubic metres of water are used every year in the industry, which is enough to meet the needs of 5 million people. The

## CHANGING FASHION

wastewater that results from fabric dyeing and treatment accounts for 20% of the world's wastewater. Often, this water goes untreated and is pumped back into the water system, contaminating it with toxins and heavy metals. Textile waste and used clothing can also end up in waterways as solid waste. Ninety-two million tons of textile waste are created worldwide each year; again, this number is expected to increase to 134 million tons by 2030. While 95% of this waste could be recycled or reused, the disposability and trend turnover encouraged by fast fashion discourage this (Smith 2021). In fact, only about 20% of clothing is recycled or reused as clothing production and consumption outpaces existing, traditional recycling methods (Pal & Gander 2018:252). These statistics illustrate the nearly unprecedented environmental harm the fashion industry causes, and the ways in which fast fashion has expedited this harm.

Despite the severity of clothing production's impact on the environment, companies often pay it little to no attention. They can afford to ignore it because they do not "pay" for it. Environmental impacts, including excess water use and solid waste production, are negative externalities - they are non-monetary costs associated with a product. Because there is no dollar cost associated with the negative impact, it does not decrease company profits, and there is no incentive for the company to reduce or eliminate the impact. Thus, companies continue to sacrifice the environment, increase production, and achieve greater profits (Pal & Gander 2018:252).

## SOCIAL MEDIA AS AN ACTIVIST TOOL

To evaluate the strategy used by online activists in the environmental movement, data was collected from twenty Instagram accounts. Ten of these accounts are general accounts - they do not focus on a specific area within the environmental movement, but attempt to bring attention to many of the subcategories within the movement. The other ten accounts focus

## CHANGING FASHION

specifically on the fashion industry and its environmental impact. Fifty Instagram posts were pulled from all twenty accounts, for a total sample of 1,000 posts. Whether the post encouraged collective action, individual action, or did not include a call to action, as well as the number of likes and comments on each post, was tracked.

For the purpose of this study, a post encourages collective action if it urges viewers to participate in group events, including marches or strikes, or if it urges viewers to participate in campaigns, including email/telephone campaigns, voting in elections, running for office/volunteering with candidates, or signing petitions. Posts that encourage individual actions are focused on changes an individual can make within one's own life. This category includes urging individuals to swap out plastic bags for reusable totes or to eat more plant-based meals, among many other changes. Posts encouraging donations are also categorized as individual action. Purely informational posts, promotional posts, and "memes" or other humorous posts are categorized as "no call to action." Below, this data is used to evaluate the mobilizing strategy of the fashion-focused environmental movement, and to make comparisons between the general accounts and the fashion-focused accounts.

### *Post Categorization Data Analysis*

The following data regarding post type was collected from the sample.

Instagram account - General	Collective action	Individual action	No call to action
@intersectionalenvironmentalist	5	6	39
@sunrisemvmt	29	4	17
@climateactionlab	5	8	37
@howchangers	5	15	30
@sustainthemag	0	12	38
@greenpeaceusa	20	2	28

## CHANGING FASHION

@theslowfactory	0	9	41
@futureearth	1	3	46
@fridaysforfuture	22	4	24
@greenmatters	1	7	42
Total	88	70	342

Table 1. 500 Instagram posts from 10 general environmental accounts were categorized as “collective action,” “individual action,” or “no call to action.” 68.4% of all posts did not include a call to action (342 of 500 posts).

Instagram account - Fashion-focused	Collective action	Individual action	No call to action
@thesustainablefashionforum	10	9	31
@the_rogue_essentials	7	13	30
@sustainableoutfits	3	0	47
@acteevism	4	11	35
@fash_rev	10	4	36
@marielle.elizabeth	1	1	48
@aditimayer	11	0	39
@ajabarber	4	7	39
@ssustainably_	16	24	10
@collectivefashionjustice	2	6	42
Total	68	75	357

Table 2. 500 Instagram posts from 10 fashion-focused environmental accounts were categorized as “collective action,” “individual action,” or “no call to action.” 71.4% of all posts did not include a call to action (357 of 500 posts).

Based on the raw data, each general account averaged 8.8 collective action posts, 7.0 individual action posts, and 34.2 posts without a call to action. Each fashion-focused account averaged 6.8 collective action posts, 7.5 individual action posts, and 35.7 posts without a call to action. Overall, the general account posts included 20 more calls to collective action than the fashion-focused accounts did, and 5 fewer calls to individual action. The statistical significance



## CHANGING FASHION

of these differences was assessed using a two-tailed t-test. An alpha value of .05 and a confidence interval of .95 were used. See Appendix for standard deviation and standard error calculations for each t-test, as well as the t-table used.

$$\text{Collective Action, general vs. fashion: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{(8.8 - 6.8)}{1.313} = \frac{2.0}{1.313} = 1.523$$

$$\text{Individual Action, general vs. fashion: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{(7.0 - 7.5)}{1.130} = \frac{0.5}{1.130} = .442$$

The t-tests determined that the differences in the number of calls to collective action and individual action between general accounts and fashion accounts are statistically insignificant.

### *Post Interaction Data Analysis*

In addition to the data on post type, viewer interaction with posts was also measured using the number of likes and comments on each post. The average likes and comments per account are listed in the tables below.

Instagram account - General	Average likes	Average comments
@intersectionalenvironmentalist	9,139.42	50.76
@sunrisemvmt	5,652.42	84.66
@climateactionlab	242.28	5.32
@howchangers	96.08	10.68
@sustainthemag	241.34	17.12
@greenpeaceusa	2,145.12	49.48
@theslowfactory	8,193.38	101.10
@futureearth	6,107.72	44.34
@fridaysforfuture	5,012.1	33.92
@greenmatters	4,733.44	64.40
Averages across accounts	4,156.33	46.18

Table 3. The likes and comments on 50 Instagram posts per account were averaged for 10 general

## CHANGING FASHION

environmental Instagram accounts. The cumulative average likes per post was approximately 4,156 and the cumulative average comments per post was approximately 46.

Instagram account - Fashion	Average likes	Average comments
@thesustainablefashionforum	3,022.08	58.64
@the_rogue_essentials	5,225.46	68.64
@sustainableoutfits	341.94	18.42
@acteevism	3,912.10	38.28
@fash_rev	3,526.42	40.62
@marielle.elizabeth	3,114.70	133.38
@aditimayer	1,669.22	42.22
@ajabarber	10,288.16	212.68
@ssustainably_	3,582.64	58.6
@collectivefashionjustice	198.94	12.90
Averages across accounts	3,488.17	68.44

Table 4. The likes and comments on 50 Instagram posts per account were averaged for 10 fashion-focused environmental Instagram accounts. The cumulative average likes per post was approximately 3,488 and the cumulative average comments per post was approximately 68.

The raw data shows that general accounts receive approximately 668 more likes per post than fashion-focused accounts, but fashion-focused accounts receive approximately 22 more comments per post. To interpret this data, the follower count per Instagram account was noted and the follower counts for all ten general accounts were averaged together. See Appendix for each account's number of followers. The follower counts for the ten fashion-focused accounts were also averaged together. Using these averages, the average like ratio and the average comment ratio for each account type was calculated.

$$\text{General accounts} - \text{avg. like ratio: } \frac{\text{avg. follower count}}{\text{avg. likes per post}} = \frac{239,546}{4,156.33} = 62.917$$

$$\text{General accounts} - \text{avg. comment ratio: } \frac{\text{avg. follower count}}{\text{avg. comments per post}} = \frac{239,546}{46.18} = 4,776.912$$

## CHANGING FASHION

$$\text{Fashion accounts} - \text{avg. like ratio: } \frac{\text{avg. follower count}}{\text{avg. likes per post}} = \frac{117,704}{3,488.17} = 33.744$$

$$\text{Fashion accounts} - \text{avg. comment ratio: } \frac{\text{avg. follower count}}{\text{avg. comments per post}} = \frac{117,704}{68.44} = 1,719.86$$

These calculations show that, on average, a general environmental account receives 1 like for every ~63 followers and 1 comment for every ~4,777 followers. Fashion-focused environmental accounts receive 1 like for every ~34 followers and 1 comment for every ~1,720 followers on average. Once again, a two-tailed t-test was used to determine if the differences between these averages was statistically significant. An alpha value of .05 and a confidence interval of .95 were applied. See Appendix for standard deviation and standard error calculations for each t-test, as well as the t-table used.

$$\text{Like Ratio: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{62.92 - 33.74}{3.02} = \frac{29.18}{3.02} = 9.66$$

$$\text{Comment Ratio: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{4776.91 - 1719.86}{29.54} = \frac{3057.05}{29.54} = 103.49$$

The t-tests determined that the difference between the general accounts' average like ratio and the fashion-focused accounts' average like ratio is statistically significant. The same conclusion was reached regarding the average comment ratio difference.

### *Implications for Effectiveness of Eco-Activism Online*

Given the theoretical power of collective action in achieving change, it may be assumed that activists would encourage such action above all else in their activism, including online. However, this is not the case within the environmental movement, especially within the sub-movement focused on the fashion industry. Instagram accounts focused on the fashion industry encourage collective action less often than they encourage individual action. While individual change may be easier to accomplish, in the long run it is most effective to work toward collective action. To have a real, long-lasting impact, industry-wide changes need to be

## CHANGING FASHION

the movement's primary focus, not an afterthought (Leonard 2013:248). Social media is a tool well-suited for mobilizing large groups to act collectively, but eco-fashion activists are failing to take advantage of this capability (Turner 2013). The online fashion-focused environmental movement, then, is falling short of its potential to effect change. Given the statistical insignificance of post type differences across account types, this shortcoming can be extended to the environmental movement at large. A shift in strategy is needed to accomplish the change required by the urgency of the climate crisis.

It is also important to note that the vast majority of posts from both account types did not include a call to action of any kind. Of the 1,000 posts, 699 were purely informational, promotional, and/or humorous. This is further evidence that activists in the environmental space are not using Instagram as effectively as possible. While informational posts are useful for educating nonactivists about a cause, nonactivists also need to be told how to act on this information. As it stands right now, there are approximately 3 posts urging collective action for every 14 posts providing information. This ratio lends itself to information saturation but few outlets for nonactivists to act on this information. If the full potential of mobilizing tools like Instagram are to be realized, the activists utilizing them need to make collective action a central tenet of their online activism.

Despite these shortcomings, the average like and comment ratios for fashion-focused environmental accounts create new opportunities for mobilization. A follower of a fashion-focused account is almost twice as likely to "like" a post than a follower of a general account. In addition, fashion-focused posts are more than 2.5 times more likely to garner a comment from a viewer than a general account post. Because engagement rates on fashion-focused posts are much higher, their follower lists likely include a greater proportion of

## CHANGING FASHION

high-probability nonactivists (Oliver & Marwell 1992:253-254). This puts fashion-focused environmental accounts in a better position to encourage collective action, if they choose to do so. Moving forward, activists should evaluate their online activism to determine what is driving current engagement, and how they can adapt to encourage more collective action among their followers.

## POSITIVE AND NEGATIVE CHANGES IN FASHION (SO FAR)

### *Positive Changes in the Fashion Industry*

The fashion industry has evolved, to a limited extent, and sustainable efforts are increasingly common. Sustainable fiber technologies and improvements in corporate sustainability are both happening and necessary to reduce the industry's environmental impact (Bick, Halsey, & Ekenga 2018:2-3). Sustainable fibers reduce environmental pollution as well as human and natural resource exploitation in garment production. Lyocell (a fiber made from bamboo cellulose), for example, is produced in a closed loop facility that recycles 99% of the chemicals used in development. This reduces resource use and pollution in the community (Bick et al. 2018:3). Compared to polyester, which is made of petroleum and requires crude oil for production, and cotton, which accounts for 25% of all pesticide use in the United States and has a large water footprint, innovative new fibers like lyocell and ingeo (made of corn by-products) have much less environmental impact (Claudio 2007:a450; a454). Recycled plastics - preferable to virgin synthetic fibers - are now being used by brands like Girlfriend Collective and Adidas in an effort to reduce their ecological footprint. Girlfriend Collective is an activewear brand whose products are made entirely of recycled plastics, and Adidas has integrated recycled polyester and nylon into their collaboration with designer Stella McCartney (TDL). These efforts by brands are an important step in the right direction.

## CHANGING FASHION

Certification programs are crucial in upholding fair production practices (Bick et al. 2018:3). Oeko-Tex Standard 100 and Fairtrade America are two leading certifications that signal sustainable social and environmental corporate practices. Oeko-Tex Standard 100 was established in 1992 as a testing and certification program to protect consumers against harmful chemicals, both regulated and unregulated, that are often used in garment production (Claudio 2007:a454). Fairtrade America certifies products from all industries worldwide on the basis of their environmental, economic, and social standards using a third-party auditor, FLOCERT (“Get Fairtrade Certified”). As part of the Environmental Responsibility section of the Fairtrade Textile Standard, a certified company is prohibited from using chlorine bleaching, sandblasting, and Potassium Permanganate spray in any of their processes. They must also treat all wastewater to prevent groundwater pollution and appoint an Environmental Officer to ensure compliance with Environmental Responsibility standards, among a host of other requirements (“Fairtrade Textile Standard”). Both Oeko-Tex Standard 100 and Fairtrade America can help consumers distinguish between responsible and irresponsible clothing brands, and may incentivize other brands to adjust their practices to achieve certification. These positive outcomes, however, require educating the public about the meaning and importance of such standards.

Another important element of sustainability in fashion is the circular economy. Reusing garments and textiles is most effective at limiting production impacts. While textile recycling is difficult because of the prominence of blended fibers in textile production, other forms of reuse are increasingly popular (Pal & Gander 2018:255). One of the primary ways in which clothes are recycled today is through resale. In 2006, it was estimated that 12-15% of Americans shopped at consignment or thrift stores, and used clothing is becoming increasingly popular with the expansion of the Internet and online resale sites (Claudio 2007:a451-a452). Overall, the global

## CHANGING FASHION

secondhand market is expected to grow to \$64 billion by 2024 (Deighton 2020). Various clothing brands, including Levi Strauss & Co., Gucci, Ba&sh, and COS, are attempting to respond to this growth in demand for secondhand pieces by launching their own online resale marketplaces.

IKEA has taken their foray into the secondhand market one step further - they plan to become entirely circular and climate positive by 2030. As part of this plan, the housewares and furniture chain opened their very first brick-and-mortar secondhand store in Sweden in November 2020. The store, which stocks only secondhand IKEA pieces, offers customers a more typical retail experience than many other secondhand options and could serve as a blueprint for other large chains to follow (Deighton 2020).

### *Negative Changes in the Fashion Industry*

Despite the recent improvements in fashion discussed above, not all industry change has been positive. In response to increased social awareness and consumer demand for eco-friendly options, many brands have employed greenwashing. Greenwashing is the “practice of making unwarranted or overblown claims of sustainability or environmental friendliness in an attempt to gain market share” (Dahl 2010:a247). As a term, greenwashing has been in use since the 1980s, but its use as a practice has escalated since 2000 with the increase in consumer demand for sustainable products. In a 2009 study, TerraChoice, an environmental marketing agency, found that 98% of 2,219 “green” claims were actually greenwashing (Dahl 2010:a247). TerraChoice defines the following practices as the “seven sins of greenwashing:” the hidden trade-off, no proof, vagueness, irrelevance, lesser of two evils, fibbing, and false labels (Dahl 2010:a249).

Greenwashing this pervasive is able to continue because environmental advertising is not tightly regulated in the United States. The Federal Trade Commission does publish the “Green Guides” in an attempt to regulate this area of advertising, but before the 2009 TerraChoice study

## CHANGING FASHION

they were last updated in 1998 (most recently they were updated in 2012) (Dahl 2010:a248).

Additionally, these advertising regulations are difficult to enforce because they can only block materially false information, and not intentionally misleading claims (Dahl 2010:a252). The inadequacy of government regulations combined with the more than 500 green certifications in use in 2010 make green claims exceedingly unreliable and leave consumers to fend for themselves when searching for truly eco-friendly products (Dahl 2010:a248).

Cleaners, cosmetic products, and children's products are particularly susceptible to greenwashing, but greenwashing charges have been brought against clothing brands as well. Even with inadequate regulations, the FTC charged four clothing and/or textile sellers with deceptive advertising in 2009, after they labeled items as made of biodegradable bamboo when they were actually composed of rayon, a semi-synthetic fiber (Dahl 2010:a248; a250). Terms like "circular," "secondhand," and "upcycling" are already being used in greenwashing campaigns in the fashion industry due to the growth of the secondhand market in recent years (2020 Secondhand).

Aside from preventing consumers from buying actually sustainable products in the present, greenwashing also has the potential to make consumers so skeptical of green labels that they ignore them altogether. If this skepticism does occur, generating environmental improvements will become more difficult as companies will lose any economic incentive to improve their practices (Dahl 2010:a252). Non-government organizations like Greenpeace have attempted to counteract greenwashing by providing resources to consumers, but overcoming the lack of transparency and information is an ongoing struggle (Dahl 2010:a250-a251).

## CONCLUSION

The fashion industry is a primary contributor to climate change. At nearly every stage of



## CHANGING FASHION

the production process, resources are overused and the environment is strained. Fast fashion, a now-dominant model within the industry, is responsible for much of the accelerated consumption and disposal of clothing and textiles in recent years. Built on the premise of new trends, constant purchasing, and cheap prices, the model has severe environmental and social costs. Fast fashion requires low production costs, including low wages and few worker protections, at the expense of garment workers assembling clothing in LMICs. The model encourages constant disposal of “old” clothing; this has become a common practice in the U.S., where 85% of the clothing purchased in a given year will also be disposed of in that same year (Bick et al. 2018:1). Major, industry-wide changes, demanded via collective action, need to be made in this and other industries if there is any hope of limiting climate change’s impact.

Oliver and Marwell’s mobilization theory, as well as Leonard’s collective action theory and Turner’s theory about social media in social movements provide valuable insight into the power of social media to effect large-scale change by mobilizing nonactivists (Oliver & Marwell 1992; Leonard 2013; Turner 2013). Social media is a valuable tool for reaching audiences outside of an activist’s existing social network, clarifying what nonactivists are high-probability, and for making requests for limited time contributions. It’s value in movements is exemplified by Occupy Wall Street, among others, in recent years. However, if it is not used to emphasize collective action, resulting changes may not be as impactful as activists hope.

The data analysis reveals that online fashion-focused environmental activism is not focused on collective action. Instead, it balances collective action with individual action, and its primary focus seems to be sharing information with nonactivists. The same can be said of environmental activism in general. In a 1,000 Instagram post sample, collective action was encouraged about as often as individual action (156 posts vs. 145 posts). In addition, posts

## CHANGING FASHION

without a call to action made up the vast majority of the sample (699 posts). Online environmental activists are providing information to nonactivists, but are not directing them to use this information in collective action. This failure inhibits the growth and impact of the environmental movement, including in its mission to effect change in the fashion industry. An encouraging finding is the rate of engagement consumers have with fashion-focused content. This may indicate a greater proportion of high-probability nonactivists and the potential for greater impact, if activists shift their strategy to collective action.

Positive changes have occurred in the fashion industry in the 21st century. New, more sustainable fibers have been developed and some companies are recycling plastics for use in garments. Green certifications, including Oeko-Tex Standard 100 and Fairtrade America, encourage sustainable social and environmental business and production practices. Secondhand clothing is growing in popularity, and brands are launching their own online secondhand marketplaces. While these are encouraging signs, negative changes have also occurred. Greenwashing is particularly worrisome, as it threatens the credibility of green certifications and the public's willingness to purchase products that claim to be eco-friendly.

Further research is needed to determine the role of gender in both the rise of fast fashion and fashion-focused online activism. Claudio draws attention to fast fashion's appeal to teenage girls and young women; gendered notions of fashion, as well as the manipulation of gendered appearance-based expectations, should be examined for their potential role in the rise of the fast fashion business model (Claudio 2007). Research into the gender breakdown of online activists in the fashion-focused environmental space could provide valuable information into how gender affects one's identification with a cause. Additionally, Instagram has become a popular marketing platform for many brands, including clothing companies. This may counteract some of

## CHANGING FASHION

climate activism's achievements on the platforms, and research into this relationship is needed.

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CHANGING FASHION

APPENDIX

Collective Action T-test (p. 16):

Average collection action posts per general environmental account:  $\mu = 8.8$

General account	Collective action	$x_i - \mu$	$(x_i - \mu)^2$
@intersectionalenvironmentalist	5	$5 - 8.8 = -3.8$	$(-3.8)^2 = 14.44$
@sunrisemvmt	29	$29 - 8.8 = 20.2$	$(20.2)^2 = 408.04$
@climateactionlab	5	$5 - 8.8 = -3.8$	$(-3.8)^2 = 14.44$
@howchangers	5	$5 - 8.8 = -3.8$	$(-3.8)^2 = 14.44$
@sustainthemag	0	$0 - 8.8 = -8.8$	$(-8.8)^2 = 77.44$
@greenpeaceusa	20	$20 - 8.8 = 11.2$	$(11.2)^2 = 125.44$
@theslowfactory	0	$0 - 8.8 = -8.8$	$(-8.8)^2 = 77.44$
@futureearth	1	$1 - 8.8 = -7.8$	$(-7.8)^2 = 60.84$
@fridaysforfuture	22	$22 - 8.8 = 13.2$	$(13.2)^2 = 174.24$
@greenmatters	1	$1 - 8.8 = -7.8$	$(-7.8)^2 = 60.84$

$$\Sigma (x_i - \mu)^2 = 1027.60$$

$$\text{Standard deviation: } s = \sqrt{\frac{1027.60}{(N-1)}} = \sqrt{\frac{1027.60}{9}} = \sqrt{114.178} = 10.685$$

Average collective action posts per fashion-focused environmental account:  $\mu = 6.8$

Fashion account	Collective action	$x_i - \mu$	$(x_i - \mu)^2$
@thesustainablefashionforum	10	$10 - 6.8 = 3.2$	$(3.2)^2 = 10.24$
@the_rogue_essentials	7	$7 - 6.8 = 0.2$	$(0.2)^2 = 0.04$

## CHANGING FASHION

@sustainableoutfits	3	$3 - 6.8 = -3.8$	$(-3.8)^2 = 14.44$
@acteevism	4	$4 - 6.8 = -2.8$	$(-2.8)^2 = 7.84$
@fash_rev	10	$10 - 6.8 = 3.2$	$(3.2)^2 = 10.24$
@marielle.elizabeth	1	$1 - 6.8 = -5.8$	$(-5.8)^2 = 33.64$
@aditimayer	11	$11 - 6.8 = 4.2$	$(4.2)^2 = 17.64$
@ajabarber	4	$4 - 6.8 = -2.8$	$(-2.8)^2 = 7.84$
@ssustainably_	16	$16 - 6.8 = 9.2$	$(9.2)^2 = 84.64$
@collectivefashionju stice	2	$2 - 6.8 = -4.8$	$(-4.8)^2 = 23.04$

$$\Sigma (x_i - \mu)^2 = 209.60$$

$$\text{Standard deviation: } s = \sqrt{\frac{209.60}{(N-1)}} = \sqrt{\frac{209.60}{9}} = \sqrt{23.289} = 4.826$$

Standard error:

$$s_d = \sqrt{\left(\frac{s_1}{N_1}\right) + \left(\frac{s_2}{N_2}\right)} = \sqrt{\frac{10.685}{9} + \frac{4.826}{9}} = \sqrt{1.187 + .536} = \sqrt{1.723} = 1.313$$

$$\text{T-test: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{8.8 - 6.8}{1.313} = \frac{2}{1.313} = 1.523$$

$$\text{Degrees of freedom: } ((N_1 + N_2) - 2) = (10 + 10) - 2 = 18$$

The difference in number of collective action posts on general accounts and the number of collective action posts on fashion-focused accounts is statistically insignificant.

T-table used can be found at: <https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf>

*Individual Action T-test (p. 16):*

Average individual action posts per general environmental account:  $\mu = 7$

General account	Individual action	$x_i - \mu$	$(x_i - \mu)^2$
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## CHANGING FASHION

@intersectionalenvironmentalist	6	$6 - 7 = -1$	$(-1)^2 = 1$
@sunrisemvmt	4	$4 - 7 = -3$	$(-3)^2 = 9$
@climateactionlab	8	$8 - 7 = 1$	$(1)^2 = 1$
@howchangers	15	$15 - 7 = 8$	$(8)^2 = 64$
@sustainthemag	12	$12 - 7 = 5$	$(5)^2 = 25$
@greenpeaceusa	2	$2 - 7 = -5$	$(-5)^2 = 25$
@theslowfactory	9	$9 - 7 = 2$	$(2)^2 = 4$
@futureearth	3	$3 - 7 = -4$	$(-4)^2 = 16$
@fridaysforfuture	4	$4 - 7 = -3$	$(-3)^2 = 9$
@greenmatters	7	$7 - 7 = 0$	$(0)^2 = 0$

$$\Sigma (x_i - \mu)^2 = 154$$

$$\text{Standard deviation: } s = \sqrt{\frac{154}{(N-1)}} = \sqrt{\frac{154}{9}} = \sqrt{17.111} = 4.137$$

Average individual action posts per fashion-focused environmental account:  $\mu = 7.5$

Fashion account	Individual action	$x_i - \mu$	$(x_i - \mu)^2$
@thesustainablefashionforum	9	$9 - 7.5 = 1.5$	$(1.5)^2 = 2.25$
@the_rogue_essentials	13	$13 - 7.5 = 5.5$	$(5.5)^2 = 30.25$
@sustainableoutfits	0	$0 - 7.5 = -7.5$	$(-7.5)^2 = 56.25$
@acteevism	11	$11 - 7.5 = 3.5$	$(3.5)^2 = 12.25$
@fash_rev	4	$4 - 7.5 = -3.5$	$(-3.5)^2 = 12.25$

## CHANGING FASHION

@marielle.elizabeth	1	$1 - 7.5 = -6.5$	$(-6.5)^2 = 42.25$
@aditimayer	0	$0 - 7.5 = -7.5$	$(-7.5)^2 = 56.25$
@ajabarber	7	$7 - 7.5 = -0.5$	$(-0.5)^2 = .25$
@ssustainably_	24	$24 - 7.5 = 16.5$	$(16.5)^2 = 272.25$
@collectivefashionju stice	6	$6 - 7.5 = -1.5$	$(-1.5)^2 = 2.25$

$$\Sigma (x_i - \mu)^2 = 486.50$$

$$\text{Standard deviation: } s = \sqrt{\frac{486.50}{(N-1)}} = \sqrt{\frac{486.50}{9}} = \sqrt{54.056} = 7.352$$

Standard error:

$$s_d = \sqrt{\left(\frac{s_1}{N_1}\right) + \left(\frac{s_2}{N_2}\right)} = \sqrt{\frac{4.137}{9} + \frac{7.352}{9}} = \sqrt{.460 + .817} = \sqrt{1.277} = 1.130$$

$$\text{T-test: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{7.0 - 7.5}{1.130} = \frac{-0.5}{1.130} = .442$$

$$\text{Degrees of freedom: } ((N_1 + N_2) - 2) = (10 + 10) - 2 = 18$$

The difference in number of individual action posts on general accounts and the number of collective action posts on fashion-focused accounts is statistically insignificant.

T-table used can be found at: <https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf>

*Number of Followers per Account (p. 17):*

\*\*Follower counts above 9,999 are rounded to the nearest 100, and counts above 99,999 are rounded to the nearest 1,000. Follower counts are as of April 25<sup>th</sup>, 2021.\*\*

General environmentalist account	Number of followers as of 4/25
@intersectionalenvironmentalist	333,000
@sunrisemvmt	228,000
@climateactionlab	5,407

## CHANGING FASHION

@howchangers	6,348
@sustainthemag	10,700
@greenpeaceusa	317,000
@theslowfactory	284,000
@futureearth	280,000
@fridaysforfuture	451,000
@greenmatters	480,000

Fashion-focused environmental account	Number of followers as of 4/25
@thesustainablefashionforum	194,000
@the_rogue_essentials	31,300
@sustainableoutfits	14,600
@acteevism	21,700
@fash_rev	517,000
@marielle.elizabeth	50,100
@aditimayer	55,500
@ajabarber	235,000
@ssustainably_	55,300
@collectivefashionjustice	2,538

*Like Ratio T-test (p. 18):*

Average like ratio for general environmental accounts:  $\mu = 62.92$

General account	Like ratio	$x_i - \mu$	$(x_i - \mu)^2$
@intersectionalenvironmentalist	36.44	$36.44 - 62.92 = -26.48$	$(-26.48)^2 = 701.19$
@sunrisemvmt	40.34	$40.34 - 62.92 = -22.58$	$(-22.58)^2 = 509.86$

## CHANGING FASHION

@climateactionlab	22.32	$22.32 - 62.92 = -40.60$	$(-40.60)^2 = 1648.36$
@howchangers	66.07	$66.07 - 62.92 = 3.15$	$(3.15)^2 = 9.92$
@sustainthemag	44.34	$44.34 - 62.92 = -18.58$	$(-18.58)^2 = 345.22$
@greenpeaceusa	147.78	$147.78 - 62.92 = 84.86$	$(84.86)^2 = 7201.22$
@theslowfactory	34.66	$34.66 - 62.92 = -28.26$	$(-28.26)^2 = 798.63$
@futureearth	45.84	$45.84 - 62.92 = -17.08$	$(-17.08)^2 = 291.73$
@fridaysforfuture	89.98	$89.98 - 62.92 = 27.06$	$(27.06)^2 = 732.24$
@greenmatters	101.41	$101.41 - 62.92 = 38.49$	$(38.49)^2 = 1481.48$

$$\Sigma (x_i - \mu)^2 = 13,719.85$$

$$\text{Standard deviation: } s = \sqrt{\frac{13,719.85}{(N-1)}} = \sqrt{\frac{13,719.85}{9}} = \sqrt{1524.43} = 39.04$$

Average like ratio for fashion-focused environmental accounts:  $\mu = 33.74$

Fashion account	Like ratio	$x_i - \mu$	$(x_i - \mu)^2$
@thesustainablefashionforum	64.19	$64.19 - 33.74 = 30.45$	$(30.45)^2 = 927.20$
@the_rogue_essentials	5.99	$5.99 - 33.74 = -27.75$	$(-27.75)^2 = 770.06$
@sustainableoutfits	42.70	$42.70 - 33.74 = 8.96$	$(8.96)^2 = 80.28$
@acteevism	5.55	$5.55 - 33.74 = -28.19$	$(-28.19)^2 = 794.68$
@fash_rev	146.61	$146.61 - 33.74 = 112.87$	$(112.87)^2 = 12739.62$
@marielle.elizabeth	16.09	$16.09 - 33.74 = -17.65$	$(-17.65)^2 = 311.52$
@aditimayer	33.25	$33.25 - 33.74 = -0.49$	$(-0.49)^2 = .24$
@ajabarber	22.84	$22.84 - 33.74 = -10.90$	$(-10.90)^2 = 118.81$

## CHANGING FASHION

@ssustainably_	15.44	$15.44 - 33.74 = -18.30$	$(-18.30)^2 = 334.89$
@collectivefashionjustice	12.76	$12.76 - 33.74 = -20.98$	$(-20.98)^2 = 440.16$

$$\Sigma (x_i - \mu)^2 = 16,517.48$$

$$\text{Standard deviation: } s = \sqrt{\frac{16,517.48}{(N-1)}} = \sqrt{\frac{16,517.48}{9}} = \sqrt{1,835.28} = 42.84$$

Standard error:

$$s_d = \sqrt{\left(\frac{s_1}{N_1}\right) + \left(\frac{s_2}{N_2}\right)} = \sqrt{\frac{39.04}{9} + \frac{42.84}{9}} = \sqrt{4.34 + 4.76} = \sqrt{9.10} = 3.02$$

$$\text{T-test: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{62.92 - 33.74}{3.02} = \frac{29.18}{3.02} = 9.66$$

$$\text{Degrees of freedom: } ((N_1 + N_2) - 2) = (10 + 10) - 2 = 18$$

The difference in average like ratio between general accounts and fashion-focused accounts is statistically significant.

T-table used can be found at: <https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf>

*Comment Ratio T-test (p. 18):*

Average comment ratio for general environmental accounts:  $\mu = 4776.91$

General account	Comment ratio	$x_i - \mu$	$(x_i - \mu)^2$
@intersectionalenvironmentalist	6560.28	$6560.28 - 4776.91 = 1783.37$	3,180,408.56
@sunrisemvmt	2693.13	$2693.13 - 4776.91 = -2083.78$	4,342,139.09
@climateactionlab	1016.35	$1016.35 - 4776.91 = -3760.56$	14,141,811.51
@howchangers	594.38	$594.38 - 4776.91 = -4182.53$	17,493,557.20
@sustainthemag	625	$625 - 4776.91 = -4151.91$	17,238,356.65
@greenpeaceusa	6406.63	$6406.63 - 4776.91 = 1629.72$	2,655,987.28

## CHANGING FASHION

@theslowfactory	2809.10	$2809.10 - 4776.91 = -1967.81$	3,872,276.20
@futureearth	6314.84	$6314.84 - 4776.91 = 1537.93$	2,365,228.69
@fridaysforfuture	13295.99	$13295.99 - 4776.91 = 8519.08$	72,574,724.05
@greenmatters	7453.42	$7453.42 - 4776.91 = 2676.51$	7,163,705.78

$$\Sigma (x_i - \mu)^2 = 145,028,195$$

$$\text{Standard deviation: } s = \sqrt{\frac{145,028,195}{(N-1)}} = \sqrt{\frac{145,028,195}{9}} = \sqrt{16,114,243.89} = 4,014.26$$

Average comment ratio for fashion-focused environmental accounts:  $\mu = 1719.86$

Fashion account	Comment ratio	$x_i - \mu$	$(x_i - \mu)^2$
@thesustainablefashionforum	3308.32	$3308.32 - 1719.86 = 1588.46$	2,523,205.17
@the_rogue_essentials	456.00	$456.00 - 1719.86 = -1263.86$	1,597,342.10
@sustainableoutfits	792.62	$792.62 - 1719.86 = -927.24$	859,774.02
@acteevism	566.88	$566.88 - 1719.86 = -1152.98$	1,329,362.88
@fash_rev	12727.72	$12727.72 - 1719.86 = 11007.86$	121,172,981.80
@marielle.elizabeth	375.62	$375.62 - 1719.86 = -1344.24$	1,806,981.18
@aditimayer	1314.54	$1314.54 - 1719.86 = -405.32$	164,284.30
@ajabarber	1104.95	$1104.95 - 1719.86 = -614.91$	378,114.31
@ssustainably_	943.69	$943.69 - 1719.86 = -776.17$	602,439.87
@collectivefashionjustice	196.74	$196.74 - 1719.86 = -1523.12$	2,319,894.53

$$\Sigma (x_i - \mu)^2 = 132,754,380.20$$

$$\text{Standard deviation: } s = \sqrt{\frac{132,754,380.20}{(N-1)}} = \sqrt{\frac{132,754,380.20}{9}} = \sqrt{14,750,486.69} = 3,840.64$$

## CHANGING FASHION

Standard error

$$s_d = \sqrt{\left(\frac{S_1}{N_1}\right) + \left(\frac{S_2}{N_2}\right)} = \sqrt{\frac{4014.26}{9} + \frac{3840.64}{9}} = \sqrt{446.03 + 426.74} = \sqrt{872.77} = 29.54$$

$$\text{T-test: } t = \frac{(\mu_1 - \mu_2)}{s_d} = \frac{4776.91 - 1719.86}{29.54} = \frac{3057.05}{29.54} = 103.49$$

$$\text{Degrees of freedom: } ((N_1 + N_2) - 2) = (10 + 10) - 2 = 18$$

The difference in average comment ratio between general accounts and fashion-focused accounts is statistically significant.

T-table used can be found at: <https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf>