

**Master Thesis**

**Challenging Gender Roles:**

**An Analysis of Female Characters with STEM Occupations in**

**Animated Disney Movies**

Master Cultural Economics & Entrepreneurship

Academic Year 2022-2023

Student name: *Raghoebarsing, L. (Lakeisha)*

Student number: *548930*

Supervisor: *Ilaria Rosetti*

Faculty: *Erasmus School of History Culture and Communication*

Date: *14-6-2023*

## Abstract

Gender inequality is a pressing problem in our society. A few reasons for this problem are traditional values, biases, discriminations, the underrepresentation of women in certain jobs, and the representation of gender stereotypes in media. Using stereotypes in media can influence peoples, and especially children's, socialization process and career aspirations. Movies influence children the most. In cinema, males usually have more speaking roles than females. The few females who have speaking roles are usually stereotyped.

Stereotyping has caused occupational segregation. STEM fields are traditionally male dominated. In media females are also underrepresented as STEM professionals. The representation of female STEM professionals in the media has the power to shape people's view on women participating in these fields. Since Disney is the most popular children's movie production company. it is interesting to research the representation of female scientists in Disney animated movies.

To answer the central research question "*How are females working in STEM occupations represented in animated Disney movies?*", a content analysis on Disney movies that included female scientists was performed. The Disney movies analyzed in this research are Big Hero 6, WALL-E, Atlantis, and Tarzan. In all these movies, males dominated. Thus, women were underrepresented. The female STEM professionals in these movies were not in the lead of a research, nor did they have leadership or decision-making roles. However, female STEM characters from Disney movies were not represented as stereotypical females. All female characters rejected domestication and thus were not portrayed as traditional women. All female characters analyzed did not only have stereotypical feminine characteristics, but also stereotypical masculine characteristics.

This research helps to identify gender stereotypes associated with female STEM professionals in animated movies. Understanding how these females are portrayed is helpful in examining the impact of media on young viewers' attitudes and career aspirations. This information is needed to break down gender stereotypes that keep girls from choosing a career in STEM. This research contributes to raising awareness about gender representation. A suggestion for further research could be to look at gender representation in various media forms for other male-dominated occupations.

**Keywords:** *gender stereotypes, media, animation movies, Disney, STEM*

# Table of content

<b>Abstract and keywords</b> .....	
<b>List of tables and figures</b> .....	
<b>Preface</b> .....	
<b>1. Introduction</b> .....	<b>1</b>
<b>2. Literature review</b> .....	<b>2</b>
2.1 The gender inequality issue.....	2
2.1.1 Occupational Segregation .....	3
2.1.2 STEM Occupations .....	3
2.1.3 The role of gender socialization in shaping career aspirations .....	4
2.2 The problem of the representation of gender stereotypes in media .....	5
2.3 The role of gender representation in cinema.....	6
2.4 Representations of gender and STEM occupations in cinema.....	7
2.5 Gender representation in animated movies .....	8
2.6 The Walt Disney Company.....	10
2.6.1 Criticism on gender roles in Disney movies .....	10
2.6.2 The current situation of the Walt Disney Company.....	13
2.6.3 Marketing of Disney .....	15
2.6.4 STEM occupations in Disney animated movies .....	16
2.6.5 Challenges and opportunities for Disney .....	16
2.7 Conclusion .....	17
<b>3. Methodology</b> .....	<b>19</b>
3.1 Choice of method.....	19
3.2 Sampling and Data collection .....	20
3.2.1 Data selection.....	20
3.3 Operationalization.....	22
3.3.1 Operationalization of quantitative research .....	22
3.3.2 Operationalization of qualitative research .....	23
3.4 Ethical, reliability, and validity considerations.....	23
<b>4. Results</b> .....	<b>24</b>
4.1 Quantitative variable description and coding schemes .....	24
4.2 Qualitative research .....	33
4.2.1 Big Hero 6.....	33
4.2.2 Wall-E .....	39

4.2.3 Atlantis: The Lost Empire.....	41
4.2.4 Tarzan .....	46
4.3 Summary of quantitative and qualitative analysis per movie .....	50
4.3.1 Big Hero 6.....	50
4.3.2 WALL-E .....	51
4.3.3 Atlantis: The Lost Empire.....	52
4.3.4 Tarzan .....	53
<b>5. Conclusion &amp; Discussion .....</b>	<b>55</b>
<b>Appendix I: Definition of STEM character and selection criteria .....</b>	<b>67</b>
<b>Appendix II: Codebook .....</b>	<b>68</b>

# List of tables and figures

## Tables

### Chapter 2

<b>Table 2.1:</b> Disney Princess movies release during the different era's, Source: Disney.com	11
---	----

### Chapter 3

<b>Table 3.1:</b> Descriptions of the Disney animated movies under study, Source: Imbd.com	21
--	----

<b>Table 3.2:</b> Theme description according to the framework of Schiele et al. (2022)	23
---	----

### Chapter 4

<b>Table 4.1:</b> Characters and their gender (Male (M), Female (F)) of the movies under study	24
--	----

<b>Table 4.2:</b> Male and Female STEM Characters in Speaking Roles of the movies under study	25
---	----

<b>Table 4.3:</b> Female STEM Characters by Movie Role of the movies under study	25
--	----

<b>Table 4.4:</b> Female STEM Characters of the movies under study categorized by STEM field	26
--	----

<b>Table 4.5:</b> Female STEM Characters of the movies under study categorized by Professional Status	27
---	----

<b>Table 4.6:</b> Female STEM Characters of the movies under study by Characterization	28
--	----

<b>Table 4.7:</b> Female STEM Characters of the movies under study categorized by Appearance	28
--	----

<b>Table 4.8:</b> Female STEM Characters of the movies under study categorized by Hypersexualization	29
--	----

<b>Table 4.9:</b> Female STEM Characters of the movies under study categorized by Romantic Status	30
<b>Table 4.10:</b> Female STEM Characters of the movies under study categorized by Parental Role	30
<b>Table 4.11:</b> Number of times female STEM characters from the movies under study were complimented on looks vs numbers of times complimented on skills	31
<b>Table 4.12:</b> Coding scheme masculine stereotypical characteristics for the female STEM characters of the movies under study (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002)	32
<b>Table 4.13:</b> Coding scheme feminine stereotypical characteristics for the female STEM characters of the movies under study (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002)	32
<b>Table 4.14:</b> Visual appearance of female characters working in STEM from Big Hero 6	35
<b>Table 4.15:</b> Analysis of feminist themes for Big Hero 6 according to the framework of Schiele et al. (2022)	36
<b>Table 4.16:</b> Visual appearance of female character working in STEM from WALL-E	39
<b>Table 4.17:</b> Analysis of feminist themes for WALL-E according to the framework of Schiele et al. (2022)	40
<b>Table 4.18:</b> Visual appearance of female characters working in STEM from Atlantis: the lost empire	43
<b>Table 4.19:</b> Analysis of feminist themes for Atlantis: The lost empire, according to the framework of Schiele et al. (2022)	44
<b>Table 4.20:</b> Visual appearance of female character working in STEM from Tarzan	46
<b>Table 4.21:</b> Analysis of feminist themes for Tarzan according to the framework of Schiele et al. (2022)	47

## **Figures**

### **Chapter 2**

**Figure 2.1:** Percent of words spoken in Disney movies from 1989 - 2013, Source: 12  
(Fought & Eisenhauer, 2022)

**Figure 2.2:** Percentage of compliments based on appearance vs. skills in different era's 13  
(female receivers in Disney movies), Source: (Fought & Eisenhauer, 2022)

**Figure 2.3:** Organizational changes at The Walt Disney Company in 2019, source: 14

<https://impact.disney.com/diversity-inclusion/>

**Figure 2.4:** The Walt Disney Company Workforce Diversity Dashboard in 2021, source: 15  
<https://impact.disney.com/diversity-inclusion/>

## **Preface**

During the process of writing my thesis, I have received encouragement and help. Therefore, I would like to thank a few people in this preface.

First, I would like to express my gratitude towards my thesis supervisor, Ilaria Rosetti. I was pleased with the way that she guided me throughout the process. Her enthusiasm and detailed feedback helped me in completing this thesis.

Secondly, I want to thank all the teachers from the Pre-master and Master course Cultural Economics & Entrepreneurship. The knowledge I gained during these courses, helped me in conducting this research.

Lastly, I want to thank my family, friends, and colleagues for all their support throughout my studies.



# 1. Introduction

Gender inequality is a complex problem across different types of media. Media, and especially children's movies, have a big impact on how children shape their attitudes and beliefs. (Martin et al., 2002). Females remain underrepresented in the film industry. In lots of movies, and also in children's movies, gender stereotypes are often represented. The representation of gender stereotypes in children's movies affects children's perceptions, values, and beliefs. This also influences how they think about gender and occupations (Signorielli, 2012). It is important to society and the economy to spread the word about gender equality in the workforce, and in companies' outputs.

Females are not only underrepresented in the film industry, but in many more. Especially in science, technology, engineering, and mathematics (STEM) occupations. Women remain underrepresented. Reason for this is that the STEM fields are traditionally seen as 'male-jobs' since women are stereotyped to be not as good in STEM subjects such as physics, mathematics etc. as males (Sassler et al., 2017). Females working in STEM professions are also underrepresented in movies (Steinke & Tavarez, 2018). Since lots of women in movies are portrayed as the stereotypical female, it is interesting to analyze if females working in STEM professions are also stereotyped in movies. Research about the portrayal of female workers in STEM professions in children's movies is the first step before examining the effect of gender stereotypes in STEM on children's career aspirations.

Disney is the biggest industry player in children's movie production. Research from Indhumathi (2022) found that Disney movies influence children's sex role perception on career aspirations and self-esteem. Therefore, this study will focus on Disney movies. The central research question in this study is: "*How are females working in STEM occupations represented in animated Disney movies?*".

The outcomes of this research are relevant for directors, particularly in the children's movie industry. A lot of research about gender stereotypes in Disney movies has already been done. However, previous research did mostly focus on Disney Princess movies. No research on the portrayal of female STEM professionals in Disney movies has been done yet. I feel that it is important to thoroughly investigate gender representation in movies and to create awareness for a correct portrayal of gender roles in children's movies. Especially since children are the future and this new generation should break the cycle of traditional gender roles. This will not only have an impact on society but also on the economy.

In chapter two, I will discuss the findings of earlier research related to the topic. The theoretical framework will help in analyzing the results later in this research. The third chapter explains the methodology for this research. In this chapter, I will explain more about the data, validity, reliability, and how to operationalize this research. The fourth chapter will contain the results of the content analysis and provide my interpretations. Lastly, a conclusion of the thesis will be given.

## **2. Literature review**

In this chapter, I will first look into existing research with regard to the gender inequality issue, the problem of representation in media, cinema, and in animated movies. Furthermore, I will also investigate theories that are relevant to researching gender roles in movies. After this, I will investigate criticism on gender representation in Disney movies, the history of Disney, the current situation of Disney, and the challenges and opportunities of this market leader in the children's movie industry. Lastly, I will give a conclusion and address the gap I found in the current literature.

### **2.1 The gender inequality issue**

Gender inequality is a social issue that refers to the unequal treatment of individuals based on their gender. The gender inequality issue affects people of all genders, but primarily disadvantages women and girls (Dubois-Shaik & Fusulier, 2017). Gender inequality is a complex issue that unfortunately remains in the world today. Factors such as discrimination, cultural norms and bias contribute to gender inequality. Addressing gender inequality requires changes at as well individual, community, and systemic levels. Conquering the gender inequality issue is not only important for society. More active participation of women in organizations will also benefit the economy (Donald et al., 2020). Not including the contribution of women will result in a waste of resources and will eventually harm the economy.

The unequal treatment of male and females results in gender-based violence, limited access to health care, and unequal access to education (Churchill et al., 2019). Because of this, women get fewer opportunities than men which limits them to build a career and thus get a better future. Furthermore, women often earn less than males. The underrepresentation of women in leadership roles is one of the results of the gender pay gap. The gender pay gap is the gap between the earnings from men and women with the same experience and qualifications (Bishu & Alkadry, 2017). Discrimination is the key factor in the gender pay gap. This influences decisions on hiring, promotions, and salary. Gender inequality affects the economy in various ways. Women's fertility decisions and human capital investments are important factors that contribute to women's participation rate in the labor force. Women are more likely than men to work less hours so that they can take care of their family. Working less time can make it harder for women to climb the career ladder (Standing, 2022). "Barriers to women's education, employment, or occupational choice effectively reduces the pool of talent" (Silva & Klasen, 2018, p.5). When the gender pay gap disappears or gets reduced, this will result in less poverty, more productivity and thus more economic growth. Occupational segregation is one of the reasons that the gender pay gap remains a problem in society.

### ***2.1.1 Occupational Segregation***

Occupational segregation refers to the overrepresentation of either men or women in certain jobs. For example, women are more likely to have jobs in lower earning fields such as education and healthcare. Males are more likely to work in higher paying fields such as science, finance, and technology. Occupational segregation can have various causes, such as discrimination, social norms, lack of access to education and training, and the perpetuation of traditional gender roles (Wong & Charles, 2020). The division of labor within families is closely connected to gender inequality. When women's time is not considered valuable, they tend to focus on childcare and household duties, while men concentrate on work outside of the home (Dubois-Shaik & Fusulier, 2017). This division of labor results in lower returns for female education, as well as higher fertility rates and decreased human capital (Standing, 2022). This will harm their growth and development on the long-term.

Presenting gender stereotypes in media also perpetuates occupational segregation, and thus can limit the opportunities and career choices available to individuals based on their gender. Negative consequences that can occur due to stereotyping are lower wages for workers in female-dominated occupations, fewer opportunities, and a lack of diversity in certain jobs (Klasen & Minasyan, 2017). Gender stereotypes also plays part in stimulating occupational segregation by creating the belief that certain characteristics are more appropriate for one gender over the other. For example, male characters are more often portrayed as strong, brave, and assertive, while female characters are portrayed as being emotional and nurturing. This reinforces the idea leadership roles are more appropriate for men and that jobs in caregiving are more suitable for females (Heilman, 2012).

Efforts to reduce occupational segregation, and thus address the gender inequality issue, can include initiatives to increase access to education and economic opportunities for women, efforts to challenge and change harmful cultural attitudes and norms, and policies to promote gender equity and representation in areas such as politics and leadership positions (Klasen & Minasyan, 2017). Furthermore, equal pay for equal work and measures to combat discrimination and bias in hiring and promotion will also reduce occupational segregation. Undertaking action to challenge traditional gender roles and social norms will help to promote greater diversity in the working environment. One area where occupational segregation is particularly evident is in STEM occupations.

### ***2.1.2 STEM Occupations***

STEM occupations stand for Science, Technology, Engineering, and Mathematics occupations. These fields have traditionally been dominated by males, with women being underrepresented in these fields. One reason for this underrepresentation is the prevalence of gender stereotypes, which can discourage girls and women from pursuing STEM careers. Some common gender stereotypes related to STEM include the idea that women are less good in subjects such as math and science as men, or that women are more suited for nurturing and caregiving roles than for technical and analytical roles (Sassler et al., 2017). These stereotypes can create a cultural barrier for

women who are interested in STEM fields, leading them to doubt their abilities or feel that they don't belong in these fields. Research from Eagly & Karau (2002) shows that it is crucial for women to be recognized as agentic in male-gendered industries since only then they are seen as capable leaders. The disparity between men and women in STEM jobs cannot be attributed to variations in their abilities or the way they are categorized based on their abilities. Part of the reason why women are underrepresented in STEM fields is that they tend to choose STEM majors that require less mathematics, and those who graduate from these majors are more inclined to work in non-STEM professions (Jiang, 2021). Much research, such as from Xu (2015) and Jean et al. (2014) suggests that women who work in STEM professions face various financial setbacks when they take on more responsibilities related to their family. To address the underrepresentation of women in STEM fields, it is necessary to implement measures that promote a work environment that accommodates and assists women in balancing their personal and professional lives. These measures should offer women the opportunity to manage both a household and a career. It is also crucial to start challenging gender stereotypes and promoting the representation of women in STEM fields from an early age. This is because young children's beliefs and attitudes about gender roles and careers are formed in their early years and can persist into adulthood (Steyer, 2014).

Creating more inclusive and supportive work environments in STEM fields is also important, as women are more likely to leave STEM careers due to workplace culture and discrimination. Addressing gender stereotypes and promoting gender equity in STEM fields can help to create a more diverse and innovative workforce and can lead to better outcomes for both individuals and society as a whole (Dicke et al., 2019). However, if the media keeps stereotypical gender roles alive this will remain to limit women's opportunities and perpetuate inequality in many areas of life. Reason for this is that stereotypes can affect an individual's career aspirations.

### *2.1.3 The role of gender socialization in shaping career aspirations*

The media has a major impact on how children are socialized, which is of influence of their future. As they grow into adulthood, they often enjoy watching animated movies, which are prevalent across cultures. Research from Lin (2001) shows that children who own videos watch them repeatedly. The media has a significant role in influencing the attitudes, values, and behavior of its audience, especially for children since they are active learners. Thus, what you consume as a child, can affect your attitude and beliefs. Children's media can reinforce gender stereotypes and objectification through their depiction of characters, influencing the behavior and beliefs of young children who emulate what they see (Martin et al., 2002). According to research, children learn about jobs and work environments as well as the appropriate sex for each career while watching television (Signorielli, 2012). Through the gender roles linked to various characters in cartoons and animated films, young children can easily be formed or changed. This idea has also revealed that as kids enjoy watching cartoons and animated movies of their own free will, they begin learning continually and

quickly from the programs. The development of socially acceptable ideas and behaviors is specifically the responsibility of the media and television. As a result, when these kids reach adulthood, they start acting the way they've seen in movies. Therefore, these films are the main source of children's gender ideology (Signorielli, 2012).

Movies should show children to acquire more independent gender-role aspirations. There is more need for aspirational female role models who hold a wider variety of leadership roles in professional fields. The ambitions of girls and young women may be influenced by film producers by boosting the quantity and diversity of female leaders and role models on screen (Steyer, 2014). Viewers may be impacted in at least two separate ways if female characters are underrepresented on screen; 1) Young children are raised on biased messages about genders. Some kids could start to accept inequality in the narrative with time and repeated exposure. Girls, young women, boys, and young men may fail to question or even recognize gender prejudice in a range of academic, athletic, social, or even professional contexts as a result of this normalizing process. 2). If detected, the lack of gender parity in media may convey to girls that they are less valuable than boys. As a result, female viewers may feel less valuable or less confident in society (Ahmed & Wahab, 2014). Thus, they will be less motivated to apply for high positions, which is a negative externality and a cost to society. In the next paragraph, I will dive into why gender stereotyping in media is problematic.

## **2.2 The problem of the representation of gender stereotypes in media**

Gender inequality is a problem across all forms of media, such as television, film, advertising, and online media. In the past, gender representation in the media has been focused more on male perspectives, with men being overrepresented in media. “This underrepresentation of females in media has been said to reflect the worth of girls and women in society” (Diekman and Murnen, 2004, p. 375). Historically, media representations of gender have been characterized by stereotypes, bias, and limited diversity, which has contributed to the unequal treatment of males and females. Usually, women are portrayed in stereotypical roles and are objectified. Colored women, members of the LGBTQ+ community, and people with disabilities are even more underrepresented or are portrayed as stereotypical (Collins, 2011).

Damsels in distress is a theme that often occurs in media, especially in books, television series, movies, and video games. This theme refers to females that need to be saved by the by the central male character in a movie (Hine et al., 2018). The damsels in distress theme underestimates women's ability to save themselves. Media often depicts gender roles in limited and narrow ways, which can limit the aspirations and opportunities for people who do not conform to those roles. This can negatively impact as well individuals as society. The media's portrayal of gender often influences how people interact with each other. Additionally, the mass media is an effective tool for helping viewers form their identities and comprehend the significance of race and gender in society (Wynns and Rosenfeld, 2003).

Lately, there has been more awareness of the problem of incorrect gender portrayal in media due to the fourth wave of feminism. The fourth wave of feminism, which started around 2012, can be defined as “a resurgence of feminism that is driven by younger women who harness the power of the Internet and social media to challenge gender inequity” (Maclaren, 2015, p.1732). Independence, career opportunities, embracing all body images, the right to make their own choices, and the inclusion of the LGBT community are important in this fourth wave of feminism. People nowadays are expressing their wants and needs through the internet. Viral social media campaigns such as #MeToo created more awareness and visibility for gender inequality. Mass communication during this fourth wave of feminism has ensured more awareness of feminism and has also increased the commercialization of feminism (Mohajan, 2022). Because of this movement, organizations have become more aware of the importance of diversity. However, some companies implement diversity strategies for financial incentives (Hebl & Avery, 2013).

Despite research on the topic and some progress, gender representation in the media remains a major issue. Diversity should be supported, and harmful stereotypes and biases should be challenged in media productions. Media forms that have a lot of influence on social behavior are television and movies.

### **2.3 The role of gender representation in cinema**

It is known that women are underrepresented in the film industry, which is one of the cultural industries (Steyer, 2014). Male characters often have more speaking roles than female characters. Women have also traditionally been underrepresented behind the camera since directing and producing roles are male dominated. This limits women from telling their stories and having their voices heard. Research from Smith et al. (2022) indicates that there is a correlation between the underrepresentation of women in the movie industry and the lack of women working behind the camera.

Studies have frequently revealed that individuals of each gender, particularly females, are frequently portrayed using stereotypical characteristics that define them solely based on their physical appearance or conduct in relationships, with limited personality traits and roles. The stereotype emphasizes the importance of beauty, thinness, physical appearance, and sexual attractiveness in determining the worth of girls and women (Ward & Grower, 2020b). Investigation from Sink & Mastro (2017) showed that females on television tend to prioritize their appearance. They are frequently evaluated based on their looks and are more prone to sexual objectification than males. Male characters are more prone to exhibit physical aggression and bossiness towards others and are less likely to display fear, politeness, fragility, or romanticism compared to female characters (Ward & Grower, 2020b). A study from Signorielli (2012) argues that men are typically depicted in professional work settings, whereas women are frequently shown in domestic settings. Even when

women are portrayed in the workplace, their occupations tend to align with traditional gender stereotypes.

However, in recent years there has been an increased focus on the need for greater diversity and inclusion in the film industry. There has also been a growth in the number of initiatives of supporting women in the film industry. Diversity in the film industry, has become more popular from both an economic and social point of view (Dhami, 2021). This has led to more movie production companies implementing diversity and inclusion policies and thus hiring more women and ethnic minorities. The increase in number of female directors and producers has led to more female-led films being made. Companies that are active in the film industry had to adapt and thus become more diverse to play into the market.

Movies and television have a significant impact on social behavior, especially among young children. Gender representation in movies can influence how children perceive certain occupations and the roles of men and women in society. It is important to include diverse representations in cinema, especially in children's movies. Diversity in children's movies can prevent children from believing stereotypes.

#### **2.4 Representations of gender and STEM occupations in cinema**

For decades, as well children as young adults have been describing scientists in stereotypical terms, portraying them as older white men with disheveled hair, social awkwardness, glasses, and lab coats, who work in isolation, conducting hazardous experiments in laboratories (Cheryan, Master, & Meltzoff, 2015; Tan, Jocz, & Zhai, 2015; Steinke et al., 2012). Having fewer female STEM professionals as a role model does not only reinforces the masculine image of STEM fields but also contributes to the organization of these fields. The representation of female STEM professionals in media has the power to shape how the public views women's participation, status, roles, and contributions in these fields.

Research from Steinke & Tavaréz (2018) found that female characters involved in STEM fields in Hollywood movies, are usually cast in secondary or co-lead positions. Furthermore, the research found that none of the analyzed movie characters had children and that they were equally likely to be in either a romantic relationship or single. The study also found that most female characters working in STEM were portrayed as Caucasian scientist who are mostly employed as a biologist or astronaut. This study of Steinke & Tavaréz (2018) also revealed that the attractiveness of female STEM characters remained a focal point in Hollywood movies. Almost all (95%) of the analysed female STEM characters were portrayed by Hollywood actresses who were considered glamorous, popular, and physically appealing. These findings suggest that the film industry tends to depict female STEM professionals as attractive women, using a Hollywood standard of beauty as the basis for this image (Bazzini, Curtin, Joslin, Regan, & Martz, 2010). Depicting female STEM

professionals as attractive in film portrayals may serve an important purpose by countering the traditional and unflattering stereotypes that have been historically associated with scientists, such as being mad, geeky, nerdy, clumsy, absent-minded, lonely, or antisocial (Cheryan et al., 2015). Nevertheless, emphasizing the physical attractiveness of female STEM characters carries the danger of presenting depictions that ignore their abilities as scientists.

## **2.5 Gender representation in animated movies**

Even though this does not correctly represent society nowadays, women in animated shows and movies are often portrayed as domestic, preoccupied with their families and personal connections, and less competent than males (Harriger, 2021). They are also portrayed as emotionally and financially dependent on men. Male characters in animated movies were often portrayed as aggressive and strong, while female characters were portrayed as pretty and sensitive. Furthermore, in animated movies, occupational segregation is often depicted in a stereotypical manner, with male characters occupying jobs typically associated with men (e.g. doctors, engineers, scientists) and female characters occupying jobs typically associated with women (e.g. nurses, teachers, homemakers) (Baker & Raney, 2007)). The fact that women are incorrectly portrayed in movies for young audiences is highly problematic. An example of incorrect gender representation in an animated movie is Barbie. Barbie is attractive according to Western beauty standards. She is attractive, skinny, tall, has long blonde hair and blue eyes. In addition to her domestic duties, Barbie occasionally invites her friends over for coffee and cookies or she goes to the beach with Ken (Änggård, 2005). Ken also fits the male stereotype since he is tall, blond, and muscular. This narrow portrayal can contribute to the perpetuation of occupational segregation in real life, as it reinforces the idea that certain jobs are more suitable for one gender over the other (Alacovska & O'Brien, 2021).

Studies from (Ahmed & Wahab, 2014), Steyer (2014), Azmi et al. (2016), and Walsh and Leaper (2020) show that female characters are significantly underrepresented in animated movies, and when they are included, they often have less screen time and fewer speaking roles than male characters. Children may internalize certain messages from media, such as the notion that men hold greater importance than women due to the overrepresentation of male characters. Because of the many male-dominant narratives, men are often portrayed as powerful and mentally strong, whereas women are often depicted as passive and get objectified. These findings suggest that animated cartoons reinforce gender roles and stereotypes in society. The studies mentioned above argue that while animated movies may display traits commonly associated with positive masculinity, such as leadership and assertiveness, toxic masculinity is also evident through the portrayal of violence. This may have harmful effects on young audiences. The studies found that media reinforces the stereotype that men are typically more aggressive than women, as they are engaging in fights more often. The analyzed cartoons predominantly featured female characters exhibiting romantic behaviors more



frequently than their male counterparts. Furthermore, female characters showed more fear, and acted polite and supportive.

Nowadays, there are also animated movies that focus more on diversity and inclusion when it comes to the narrative and characters (Hine et al., 2018). Same as in other media, animated movies lack representation of non-binary individuals. This can contribute to a lack of understanding and acceptance of these identities among young audiences (Patterson & Spencer, 2017). Increasing gender representation in animated movies requires a commitment to diversity and inclusion at all levels of the industry, from story development to character design to voice casting. It also requires challenging traditional gender stereotypes and providing more opportunities for underrepresented voices and perspectives in animated storytelling.

However, by challenging these stereotypes and depicting characters who do not conform to traditional gender norms, animation movies have the potential to reduce the impact of occupational segregation and gender stereotypes on individuals' career choices and opportunities. By showcasing a diverse range of careers and personality traits for both male and female characters, animation movies can help children and viewers broaden their understanding of gender and reduce the impact of gender biases in the workforce. Disseminating gender stereotypes in animation movies can lead to inspiring children and viewers to challenge gender norms and consider a wider range of careers and leadership roles, regardless of their gender. Thus, children's movie production companies have an important role in shaping children's career aspirations.

The research of Schiele et al. (2020) suggests that the umbrella theme of "breaking traditional gender boundaries" can be used to analyze animated movies. The four themes that fall under this umbrella theme are: transcending patriarchal expectations, rejecting domestication, appropriating masculine attributes and roles, and reframing the meaning of true love. The concept of surpassing patriarchal norms resonates with feminist ideologies that highlight the limitations of gender roles and structural inequalities in society. Rejecting domestication resonates with the ideology of motivating young women to explore opportunities beyond the confines of the household. Appropriating masculine attributes and roles are related to breaking traditional gender boundaries. By showcasing diverse forms of affectionate connections in animated content, movie production companies offer young viewers an alternative perspective on love beyond the traditional prince and princess narrative.

There are many big production companies that create children's movies and television shows. The most famous ones are Walt Disney Animation Studios, Pixar Animation Studios, DreamWorks Animation, Nickelodeon Animation Studio, Cartoon Network Studios, and Netflix Animation. Currently, the biggest children's animation movie production company is The Walt Disney Company, followed by Pixar Animation Studios, which is also part of Walt Disney. The Walt Disney Company has been a dominant player in the children's movie industry worldwide. This company can be considered a "superstar" firm in the context of Rosen's (1981) paper "The Economics of Superstars". Since Disney is dominating the children's movie industry, they are having lots of influence on lots of

children. Thus, for this research, I will look at gender stereotypes in Disney movies. There has been a lot of criticism of gender representation in Disney movies, especially to the older movies (before 1960), and especially on the representation of Disney Princesses.

## **2.6 The Walt Disney Company**

Disney, the most popular children's movie production company has already produced over 800 movies since 1923. The first series that Disney produced was Mickey Mouse, this production was a big success and has made Disney popular. In 1937, Disney released their first movie called Snow White and the Seven Dwarfs. After Snow White and the Seven Dwarfs, Disney became popular for creating animated movies about fairy tales (Wasko, 2020). Several generations grew up watching Disney movies, and Disney movies remain popular amongst children and adults. Next to producing series and movies, Disney also generates revenue from its theme parks and movie merchandise. Pixar Studios, Lucasfilm, and Marvel Studios are also part of the Walt Disney Company. Since 2019, all the movies produced by the studios of The Walt Disney Company are available via the popular Disney+ streaming platform. Disney has been accused of using racial and gender stereotypes in an incorrect manner in their older productions, especially in the Disney Princess movies (Davis, 2005). However, Disney has not been the only children-focused company that uses gender stereotypes. In the next paragraph, I will take a closer look at the criticism that Disney has received about the gender roles presented in their movies.

### ***2.6.1 Criticism on gender roles in Disney movies***

Criticism of the gender roles in Disney movies, especially the Disney Princess movies, mostly comes from feminism. Disney Princesses stand for more than just the characters from animated movies; they are cultural symbols of childhood and representations of idealized girlhood. As a result, the Disney Princesses provide girls with a narrowly defined set of gendered roles and a strictly one-dimensional view of femininity (Wohlwend, 2009). Although presented as different personalities, most of the princesses have the same characteristics. The Princesses in Disney movies are often occupied with domestic tasks, are naïve, and are dependent on males to save them. The Princess or males are portrayed as heroes, independent, muscular, and attractive. Disney princesses are portrayed as skinny and beautiful, which are Western beauty standards. Usually, Disney princesses have characteristics of female stereotypes such as, nurturing, and sensitive. Damsels in distress is a theme that often occurs in Disney movies. Disney is also notorious for sexualizing its princesses (Wasko, 2020). Disney princes are portrayed as attractive heroes with athletic postures. They possess typical masculine characteristics such as assertiveness (Wasko, 2020). Female villains are either very skinny or overweight. Male villains are usually portrayed as not attractive. They often are tall, old, and have excessive features. It is problematic that Disney lets children assume that these appearances belong to

bad people only. One common gender stereotype present in Disney movies is the portrayal of men as dominant figures, while women are often relegated to more supportive roles (Harriger et al.,2021).

Table 2.1 shows an overview of Princesses' movies per time. In classic Disney princess movies such as Snow White, Sleeping Beauty, and Cinderella, the princesses are dependent on a male for their savior. Snow White and Cinderella are keeping themselves busy with domestic tasks such as expected of women during that period. During the third wave of feminism (during the early 90's), more modern Disney princesses such as Ariël, Belle, Mulan, Jasmine, and Pocahontas were introduced.

<b>Classics Era</b> (1937 – 1959)	<b>Snow White</b>	1937
	<b>Cinderella</b>	1950
	<b>Sleeping Beauty</b>	1959
<b>Renaissance Era</b> (1989 – 1999)	<b>The Little Mermaid</b>	1989
	<b>Beauty and the Beast</b>	1991
	<b>Alladin</b>	1992
	<b>Pocohontas</b>	1995
	<b>Mulan</b>	1997
<b>New age Era</b> (Starting from 2009)	<b>Princess and the Frog</b>	2009
	<b>Tangled</b>	2010
	<b>Brave</b>	2012
	<b>Frozen</b>	2013
	<b>Moana</b>	2016
	<b>Raya and the Last Dragon</b>	2021

Table 2.1: Disney Princess movies release during the different era's <sup>1</sup>

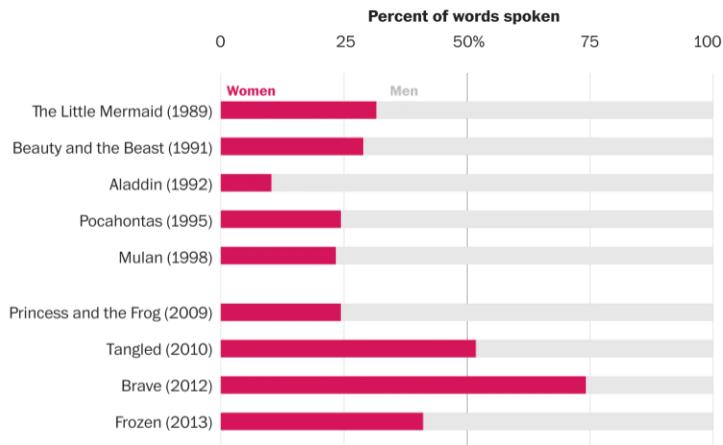
In the Disney Princess movies of the Renaissance era, the Princesses must overcome patriarchal expectations to achieve self-actualization. They are portrayed as hard-working, but they still rely on a miracle or a man for their happy ending. They also need to escape from their homes and go on an adventure to find their own path and to figure out their identity. To conclude, Disney princess movies from the 90s did become more feminist but did not completely break the cycle of gender stereotyping (Shawcroft et al., 2022). In their book, Carmen Fought and Karen Eisenhour (2022) analyzed the linguistics of Disney animated films made between 1989 and 1999, which includes several popular Disney classics featuring female-driven plots. Despite this, the male

---

<sup>1</sup> Disney.com

characters in these movies speak more frequently than their female counterparts. This issue extends beyond that particular time as well, with the hugely successful movie Frozen having women speak only 41% of the time despite having two primary female characters. Figure 2.1 shows the percent of words spoken by women in Disney movies released between 1989 - 2013.

**In Disney's modern princess movies, men often speak more than women. The films from the '90s were particularly male-dominated.**



WAPO.ST/WONKBLOG

Source: Carmen Fought and Karen Eisenhauer

Figure 2.1: Percent of words spoken in Disney movies from 1989 - 2013, Source: (Fought & Eisenhauer, 2022)

Figure 2.2 shows that the classical Disney Princesses are complimented on their appearance rather than their skills. It is problematic that women’s appearance is complimented over their skills. The research of Fought & Eisenhauer (2022) showed that throughout the years this has changed, and princesses are now complimented more on their skills than before.

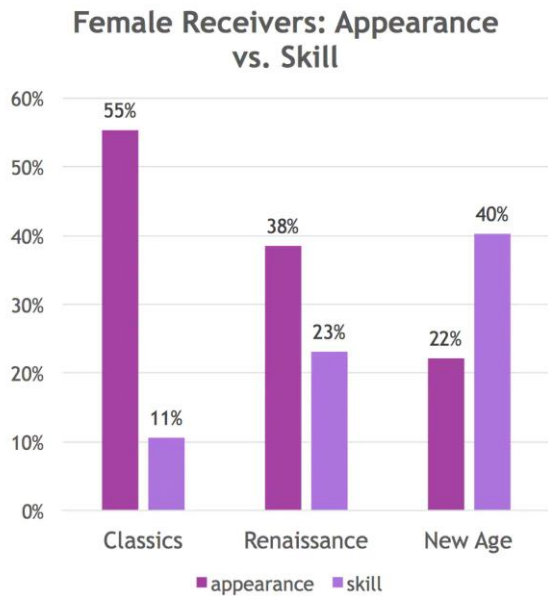


Figure 2.2: Percentage of compliments based on appearance vs. skills in different era’s (female receivers in Disney movies), Source: (Fought & Eisenhauer, 2022)

In the last few years, Disney has again put in some effort to become more diverse and inclusive. Not only as an organization, but also in their productions. In the next paragraph, I will address more about the current situation of the Walt Disney Company in relation to diversity and inclusion.

### 2.6.2 The current situation of the Walt Disney Company

Diversity in Disney movies and in The Walt Disney Company itself has received a lot of attention in the past years, as well as in scholarly publications as from consumers. This has led to Disney making changes within the organization. Since Disney has an influence on young children worldwide, they need to consider the social messages they give to their audience. Before 2020, Disney had 4 keys for their code of conduct: Safety, Courtesy, Show, and Efficiency. In 2020, Disney has added a fifth key: Inclusion. This means that they will include everyone in their organization, but also ensure more representation of minorities in their movies and theme parks. The study of Shawcroft et al. (2022) found that the inclusion of women in the production of Disney movies resulted in fewer stereotypical gender roles throughout the nine-decade period examined.

Historically, Disney has not been the most diverse organization. However, in the past decade, they have made it a priority to expand diversity at all levels of the company to benefit from the advantages that come with great diversity. Figure 2.3 shows the organizational changes of The Walt Disney Company in 2019.



Figure 2.3: Organizational changes at The Walt Disney Company in 2019, source: <https://impact.disney.com/diversity-inclusion/>

Figure 2.4 on the next page, shows an overview of the workforce at The Walt Disney Company in 2021. By the time of 2021, the workforce of Disney has included a lot more women and minorities. 50% of the workforce existed of women in 2021. Women are not only included as workers but also in the top management.

## The Walt Disney Company Workforce Diversity Dashboard

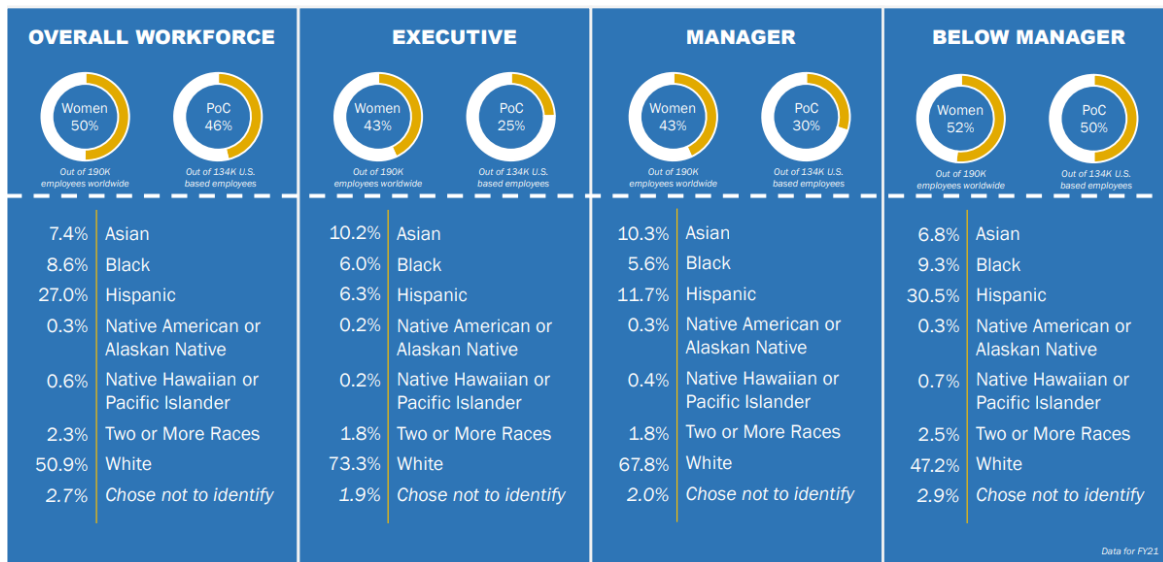


Figure 2.4: The Walt Disney Company Workforce Diversity Dashboard in 2021, source: <https://impact.disney.com/diversity-inclusion/>

As a result of the criticism, Disney started to put a disclaimer at the beginning of these movies on the Disney+ streaming platform, in which they admit that they have utilized racial and gender stereotypes improperly and have harmed individuals or cultures as a result. Disney said they are looking for ways to share their story because they are aware that they have excluded some populations. After receiving criticism, Disney has altered their stories to reflect a more modern society (NPR, 2020). However, when it comes to the marketing of Disney’s products, there is still a lot that can improve.

### 2.6.3 Marketing of Disney

Gender representation in Disney movies is closely tied to marketing strategies, as the company uses these portrayals to appeal to a certain audience and sell related merchandise. Historically, Disney has marketed their movies and merchandise based on traditional gender stereotypes, with male and female characters appearing in gendered toys and clothing. For example, male characters were often marketed as action figures, while female characters were marketed as dolls. This gendered marketing reinforces the idea that certain toys and clothing are more suitable for one gender, limiting children's understanding of gender and reinforcing gender biases (Auster & Mansbach, 2012). Disney has been trying to associate boys with Disney Princess movies by giving the movies neutral titles such as “Tangled” and “Frozen”, and by including male co-stars (Wilde 2014).

Overall, the representation of gender in Disney movies and their related marketing strategies have a significant impact on shaping children's beliefs and attitudes towards gender, including the toys and clothing they choose. By promoting gender equality and inclusiveness in its marketing strategies,

Disney has the potential to challenge traditional gender norms, reduce the impact of gender biases, and to influence children's career aspirations.

#### *2.6.4 STEM occupations in Disney animated movies*

STEM occupations are increasingly becoming an important focus for many industries, including the entertainment industry (Wille et al., 2018). Disney has been realizing the importance of including females in their movies with STEM occupations in recent years. This realization has been driven by the increasing awareness of gender inequality in STEM fields, and the demand for more diversity and inclusion presented in media (Kerkhoven et al., 2016).

Disney animated movies have featured some characters with STEM-related professions or interests, including female characters. For example, in the movie "Big Hero 6," the character Go Go Tomago is a skilled engineer who uses her knowledge to help her friends and save the day. Other Disney movies featuring female characters with STEM occupations or interests include "Wall-E," in which the character EVE is a highly advanced robot (Disney Women in STEM — The PhD Princess, 2020).

Disney has also made efforts to incorporate STEM themes into its TV shows and other media. Furthermore, they have also posted blogs about females in STEM occupations on their website. In addition to creating more diverse and inclusive content, Disney has also been investing in initiatives to promote STEM education and opportunities for underrepresented groups. In 2019, the company announced a \$1 million commitment to the United Negro College Fund to support students pursuing STEM degrees (Disney, 2023).

Overall, Disney's realization of the importance of including females in their movies with STEM occupations has been driven by a combination of changing attitudes, market demand, and a desire to promote diversity and inclusivity. While the representations of STEM occupations and female characters are positive steps toward increasing representation and breaking gender stereotypes, it is important to examine the underlying gender biases and stereotypes present in these movies to promote more accurate and diverse portrayals of STEM professionals. There are still lots of challenges for Disney to battle, but there are also a lot of opportunities.

#### *2.6.5 Challenges and opportunities for Disney*

Disney, as a large media and entertainment company, has significant influence on shaping cultural attitudes and perceptions (Wasko, 2020). This influence extends to the portrayal of gender stereotypes and the representation of female STEM occupations in their films, TV shows, and other media. The first challenge that Disney faces in this regard is their historical legacy. Disney's early films are often criticized for perpetuating traditional gender roles and stereotypes. Some of its classic princess movies, present girls as passive, submissive, and in need of male rescuers. This legacy can make it difficult for the company to change perceptions and attitudes entrenched in popular culture for



decades. A second challenge of Disney could be that Disney may feel pressure to appeal to its core audience of young children and families, who may have traditional expectations of gender roles and occupational choices (Zsubori, 2022).

An opportunity for Disney is that they can present more positive role models for girls. By portraying female characters in STEM fields, Disney can create positive role models for young girls and encourage their interest in these fields. The company can also promote diversity and inclusion by featuring characters from different ethnic and cultural backgrounds. Another opportunity for Disney is to make their movies more modern. This modernization can help the company appeal to contemporary audiences who expect more diverse and progressive representations. Yet another opportunity for Disney is to use diversity for their brand differentiation in the children's media production industry. By embracing gender diversity and promoting female representation in STEM fields, Disney can differentiate itself from other media companies and appeal to audiences who value inclusivity. The newer generations, millennials, and generation Z, find diversity and inclusion very important. Millennials and Generation Z pay more attention to diversity because they have received a better level of education than previous generations and grew up with more advanced technologies (Kaplan et al., 2020). Millennials and Generation Z are becoming parents now and will pass on their values to their children. They will oversee what their children will consume and be exposed to. Therefore, it is important for Disney to become more diverse.

Overall, Disney faces both challenges and opportunities when it comes to gender stereotypes and the representation of female STEM occupations. However, by making efforts to update its portrayal of gender roles and promote diversity and inclusivity, the company can position itself as a progressive and a forward-thinking brand.

## **2.7 Conclusion**

In conclusion, gender inequality remains an issue that affects individuals, but especially disadvantaged women and girls. One of the negative results of gender inequality is the gender pay gap. Another factor that contributes to gender inequality is occupational segregation. Reducing gender inequality will benefit the economy.

The representation of gender in media has historically been focused on male perspectives, with women and non-binary individuals being underrepresented or portrayed in stereotypical roles. This perpetuates harmful gender stereotypes and reinforces biases, limiting social progress and potentially impacting individuals' self-perceptions and interactions. Addressing systemic barriers, challenging harmful stereotypes, and supporting diverse voices are key to increasing gender representation in media and promoting social progress.

Gender representation in cinema and animated movies has been a long-standing issue that has perpetuated gender stereotypes. Studies have shown that women have been historically underrepresented in the film industry, with fewer speaking roles and limited representation in

leadership positions. Gender representation in animated movies has been problematic, with female characters often portrayed as domestic, emotionally, dependent on men, and less competent than male characters. Furthermore, occupational segregation is often depicted in a stereotypical manner in animated movies, with male and female characters occupying jobs typically associated with their respective genders.

The representation of female STEM professionals in media has the power to shape how the public views women's participation in these professions. Research from Steinke & Tavarez (2018) focused on the representation of female STEM professionals in Hollywood movies. However, there has not been any research done on the representation of female STEM professionals in animated movies. This is interesting to research since animated movies influence people's views on women's participation in the STEM fields from a young age on.

Disney, the biggest children's movie company has faced criticism for perpetuating traditional gender roles and stereotypes in its films and merchandise. In recent years, the company has taken steps to address this issue by altering its stories to reflect a more modern society and incorporating female characters in STEM occupations. However, there has not been any research done on whether these female characters with STEM occupations are represented in a stereotypical manner. Therefore, I will research how STEM occupations are represented in Disney movies, and what gender stereotypes and biases are present. STEM occupations are critical for the growth and development of society. Thus, understanding how STEM occupations are portrayed in popular culture can help researchers understand the reasons behind this gap and to address this problem. Gender stereotypes and biases can limit opportunities for women in STEM fields and can discourage girls from pursuing a career in STEM fields. Identifying and analyzing these stereotypes and biases in Disney movies can help researchers understand how such stereotypes are perpetuated and develop interventions to mitigate their impact.

The representation of gender in Disney movies has a significant impact on shaping children's beliefs and attitudes toward gender and occupations. While there are still challenges for Disney to overcome, there are also opportunities for the company to create positive role models and promote diversity and inclusion. By promoting gender equality and inclusiveness, Disney has the potential to promote a more equal and inclusive society. and thus, influence children's career aspirations.

### 3. Methodology

The research question that will be answered in this thesis is: “*How are females working in STEM occupations represented in animated Disney movies?*”. With this research, I would like to get more insight into the portrayal of gender and STEM occupations in Disney movies. This research could help raise awareness about the impact of media on children's perceptions of gender roles and their future career aspirations. Results of this research will be useful in informing media creators and producers about the need for more diverse and inclusive representation in their content. By highlighting if gender stereotypes are evident in Disney movies, this research can encourage media producers to be more intentional and deliberate in their efforts to represent women in STEM fields.

#### 3.1 Choice of method

To address the central research question, I will perform content analysis. Content analysis is one of the unobtrusive research methods and is also referred to as the study of recorded human communications (Babbie, 2020). In this case, the recorded human communications are movies. A content analysis method can be applied inductively or deductively to both qualitative and quantitative data. Qualitative content analysis is often used while analyzing movies as it is helpful in researching deeper meanings of movies, while quantitative content analysis emphasizes surface meaning (Research Methods, 2017). Using qualitative data analysis as a methodology in this research allows me to analyze the numerous interaction effects that occur in movies (Baxter, 2020). The qualitative analysis will enable a deeper examination of the content of Disney movies and the identification of themes and messages pertaining to the gender representation of STEM careers. Research on gender stereotypes in Disney movies is usually done by performing a quantitative analysis, thus including a qualitative analysis of the movies will give more detailed insights. The framework from the research on feminism in Disney movies by Schiele et al. (2022), which I plan on using, is also designed for a qualitative approach. However, I think adding an additional quantitative layer would be helpful for a systematic and objective assessment of the frequency and distribution of themes related to the portrayal of STEM careers in Disney films. A limitation of the study of Schiele et al. (2022) is that it does not include a quantitative approach that can provide valuable insights into the presence of certain patterns and messages in the movies.

I have watched Disney movies from a young age, and I have always loved watching them. My personal belief can thus influence my interpretation. Including mixed method analysis in my research, allows me to minimize personal biases in analyzing the characters and movies, and to strengthen my arguments. Ultimately, a mixed method approach will offer a more comprehensive and rigorous understanding of STEM careers in Disney movies. Using different methods may also capture different aspects.

## **3.2 Sampling and Data collection**

The units of analysis in this research are movie characters, movie scenes, dialogues, and songs. There are 802 Disney movies produced in total. The first movie that Disney released was Snow White and the Seven Dwarfs in 1937. 120 out of all Disney movies were produced in the last 10 years. 61 of the 802 movies are animated and 13 of these movies include animated Disney Princesses as protagonists (Disney.com, z.d.). In the next paragraph, I will explain how I choose which movies to analyze.

### ***3.2.1 Data selection***

The selection criteria for choosing movies to analyze for this research is that the movie must include at least one female working in the STEM field. This definition for these criteria is exactly the same as from the research of Steinke & Tarez (2018). The definition of a STEM character can be found in appendix I.

To select the films for analysis, I utilized my personal knowledge as well as resources such as the Internet Movie Database (IMDb) and Google searches. Disney movies that include females in STEM occupations are Big Hero 6, WALL-E, Atlantis: The Lost Empire, and Tarzan. In Table 3.1 on the next page, I have provided a short summary of the Disney movies that will be analyzed for this research. I have access to the primary data, which are the Disney movies, via my Disney Plus account.

Disney animated movie	Description	Female characters with STEM occupations
<b>Big hero 6 (2014)</b>	“A special bond develops between plus-sized inflatable robot Baymax and prodigy Hiro Hamada, who together team up with a group of friends to form a band of high-tech heroes”. <sup>2</sup>	<b>1. GoGo Tamago</b> <i>(Mechanical Engineering Student)</i> <b>2. Honey Lemon</b> <i>(Chemical engineering student)</i> <b>3. Abigail Callaghan</b> <i>(Pilot)</i>
<b>Wall-E (2008)</b>	“In the distant future, a small waste-collecting robot inadvertently embarks on a space journey that will ultimately decide the fate of mankind”. <sup>3</sup>	<b>4. EVE (Robot)</b>
<b>Atlantis: The Lost Empire (2001)</b>	“A young linguist named Milo Thatch joins an intrepid group of explorers to find the mysterious lost continent of Atlantis”. <sup>4</sup>	<b>5. Audrey Ramirez</b> <i>(Chief mechanic)</i> <b>6. Wilhelmina Bertha Packard</b> <i>(Chief Communications Officer)</i>
<b>Tarzan (1999)</b>	“A man raised by gorillas must decide where he really belongs when he discovers he is a human”. <sup>5</sup>	<b>7. Jane Porter</b> <i>(Primatologist)</i>

Table 3.1: Descriptions of the Disney animated movies under study, Source: Imbd.com

<sup>2</sup> [https://www.imdb.com/title/tt2245084/?ref\\_=fn\\_al\\_tt\\_1](https://www.imdb.com/title/tt2245084/?ref_=fn_al_tt_1)

<sup>3</sup> [https://www.imdb.com/title/tt0910970/?ref\\_=nv\\_sr\\_srsrg\\_2\\_tt\\_4\\_nm\\_4\\_q\\_wall-e](https://www.imdb.com/title/tt0910970/?ref_=nv_sr_srsrg_2_tt_4_nm_4_q_wall-e)

<sup>4</sup> [https://www.imdb.com/title/tt0230011/?ref\\_=nv\\_sr\\_srsrg\\_3\\_tt\\_8\\_nm\\_0\\_q\\_atlantis](https://www.imdb.com/title/tt0230011/?ref_=nv_sr_srsrg_3_tt_8_nm_0_q_atlantis)

<sup>5</sup> [https://www.imdb.com/title/tt0120855/?ref\\_=nv\\_sr\\_srsrg\\_0\\_tt\\_8\\_nm\\_0\\_q\\_tarzan](https://www.imdb.com/title/tt0120855/?ref_=nv_sr_srsrg_0_tt_8_nm_0_q_tarzan)

### 3.3 Operationalization

For the operationalization of this research, I will start with the quantitative analysis to have some objective information beforehand, followed by the qualitative analysis.

#### 3.3.1 Operationalization of quantitative research

To perform the quantitative analysis, I will use coding schemes that were used in the research of Steinke & Tavaréz (2018). The coding schemes from Steinke & Tavaréz (2018) include the following topics:

- Male and Female STEM Characters in Speaking Roles by race/ethnicity
- Female STEM Characters by Movie Role
- Female STEM Characters by STEM field
- Female STEM Characters by Professional Status
- Female STEM Characters by Characterization
- Female STEM Characters by Appearance
- Female STEM Characters by Hypersexualization
- Female STEM Characters by Romantic Status
- Female STEM Characters by Parental Role

The first table from Steinke & Tavaréz (2018) focuses on male and female STEM characters in speaking roles by ethnicity. However, in this research, I focus on gender only and not on race and ethnicity. Therefore, I adapted this first table to ‘Male and Female STEM Characters in Speaking Roles’ in my codebook.

I also created a codebook based on the coding schemes and variables from other research about gender stereotypes in animated movies (Ahmed & Wahab, 2014; Baker & Raney, 2007; England et al., 2011; Leaper et al., 2002). Reason for this is that the codebook from Steinke & Tavaréz (2018) lacks tables to quantify stereotypical behavior, requiring an additional coding scheme to identify gender stereotypes. Research from Fought & Eisenhauer (2022) inspired me to add a table to quantify the number of times female characters in STEM are complimented on their looks versus on their skills. This information is interesting for this research since it can offer insights into the representation and perception of women in these fields.

The codebook I created includes the following topics:

- Masculine stereotypical characteristics
- Feminine stereotypical characteristics
- Number of times complimented on looks vs on skills

The complete codebook can be found in appendix II.

### 3.3.2 Operationalization of qualitative research

In order to perform qualitative research, I will use the framework from the research of Schiele et al. (2020) about marketing feminism in youth media. The framework of Schiele et al. (2020) includes four feminist themes (transcending patriarchal expectations, rejecting domestication, appropriating masculine attributes and roles, and reframing the meaning of true love). I will analyze these feminist themes by naming examples and mentioning supporting scenes and quotes for the movies under study. Furthermore, I will also include character profiles based on my own observations for the female characters working in STEM fields.

#### 3.3.2.1 Variable description of qualitative analysis

Feminist theme	Theme description
<b>Transcending patriarchal expectations</b>	<i>“A heroine rebels and breaks through patriarchal expectations, and through hard work and persistence, she achieves self-actualization”.</i>
<b>Rejection of domestication</b>	<i>“Emancipation from the role of the domesticated woman”.</i>
<b>Appropriating masculine attributes and roles</b>	<i>“Heroines adopt traits that are deemed masculine by wider society, and this is frowned upon”.</i>
<b>Reframing the meaning of true love</b>	<i>“Heroines make their own romantic choices and reframe the meaning of “true love” beyond romantic pairings”.</i>

Table 3.2 Theme description according to the framework of Schiele et al. (2022)

### 3.4 Ethical, reliability, and validity considerations

The benefits of content analysis are that it is usually easier to have access to the data that will be analyzed and the ability to correct errors easily. While performing content analysis, existing data (primary data) is used which ensures the reliability of the data. The likelihood of data modification is extremely low. One of the main benefits of content analysis is the trustworthiness of the data. The limitation of content analysis in social research is that it often relies on subjectivity which can affect the validity and reliability (Bryman, 2006). However, in this research reliability and validity are ensured by using a combination of qualitative and quantitative strategies. For the quantitative variables in this research, a coding scheme with clear guidelines will be used. Thus, when someone else will code the movies, the same results will occur.

## 4. Results

### 4.1 Quantitative variable description and coding schemes

#### Characters in the Disney movies analyzed

Characters from Big hero 6	Characters from WALL-E	Characters from Atlantis: The lost city	Characters from Tarzan
Hiro Hamada (M)	WALL-E (M)	Princess Kidagakash (F)	Tarzan (M)
Tadashi Hamada (M)	EVE (F)	Milo Thatch (M)	Jane Porter (F)
Gogo Tomago (F)	John (M)	Mr. Harcourt (M)	Professor Archimedes Porter (M)
Wasabi (M)	Mary (F)	Helga Sinclair (F)	Clayton (F)
Honey Lemon (F)	Captain of the Axiom (M)	Preston Whitmore (M)	
Fred (M)	B&L spokesperson (M)	Commander Rourke (M)	
Professor Robert Callaghan (M)	MO (Unknown)	Joshua Sweet (M)	
Mr. Kabuki (M)		Mole (M)	
Abigail Callaghan (F)		Wilhelmina Bertha Packard (F)	
Aunt Cass (F)		Audrey Rocio Ramirez (F)	
		Vincenzo Santorini (M)	
		King Kashekim (M)	
		Jebidiah Allardyce (M)	

Table 4.1 Characters and their gender (Male (M), Female (F)) of the movies under study



## Male and Female STEM Characters in Speaking Roles

Gender	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Male</b>	6 (60%)	4 (66,7%)	9 (69,2%)	3 (75%)	<b>22 (66,6%)</b>
<b>Female</b>	4 (40%)	2 (33,3%)	4 (30,8%)	1 (25%)	<b>11 (33,3)%</b>
<b>Total</b>	<b>10 (100%)</b>	<b>6 (100%)</b>	<b>13 (100%)</b>	<b>4 (100%)</b>	<b>33 (100%)</b>

Table 4.2: Male and Female STEM Characters in Speaking Roles of the movies under study

By looking at the number of males and females from all the movies analyzed, it is notable that there are twice as many males (66%) compared to women (33%) featured in the movies. None of the movies had an equal amount of male and female characters. Furthermore, all the movies had a male lead. Thus, women remain underrepresented in Disney animated movies. Big Hero 6 has the best male-female ratio, while Tarzan has the worst male-female ratio. Big Hero 6 is also the newest movie analyzed, while Tarzan is the oldest movie analyzed.

## Female STEM Characters by Movie Role

Role	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Lead</b>	0	0	0	0	<b>0 (0%)</b>
<b>Co-lead</b>	2 (66,7%)	1 (100%)	0	1 (100%)	<b>5 (71,4%)</b>
<b>Secondary</b>	1 (33,3%)	0	2 (100%)	0	<b>2 (28,6%)</b>
<b>Total</b>	<b>3 (100%)</b>	<b>1 (100%)</b>	<b>2 (100%)</b>	<b>1 (100%)</b>	<b>7 (100%)</b>

Table 4.3: Female STEM Characters by Movie Role of the movies under study

Table 4.3 shows that there were no females working in STEM that had a lead role. Most of the females working in STEM were in the co-lead and a few of them were in the secondary lead. Big Hero 6 had the most female characters working as a STEM professional. WALL-E and Tarzan both only had one female character working in STEM. However, these females were in the co-lead. While Atlantis had two female characters working in STEM, they were cast in secondary roles.

### Female STEM Characters by STEM field

STEM field	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Engineering	1	0	1	0	2 (28,6%)
Computer Science	0	0	1	0	1 (14,3%)
Biology	0	0	0	1	1 (14,3%)
Chemistry	1	0	0	0	1 (14,3%)
Astronomy	0	0	0	0	0 (0%)
Mathematics	0	0	0	0	0 (0%)
Physics	0	0	0	0	0 (0%)
Psychology	0	0	0	0	0 (0%)
Robotics/ Technology	1	1	0	0	2 (28,6%)
Anthropology	0	0	0	0	0 (0%)
Geology	0	0	0	0	0 (0%)
Archaeology	0	0	0	0	0 (0%)
<b>Total</b>	<b>3 (42,8%)</b>	<b>1 (14,3%)</b>	<b>2 (28,6%)</b>	<b>1 (14,3%)</b>	<b>7 (100%)</b>

Table 4.4: Female STEM Characters of the movies under study categorized by STEM field

In the movies analyzed, most of the female STEM professionals worked in engineering and robotics/technology. In all the movies science is a prominent theme. However, in all the four movies there are only seven female characters working in STEM fields.

Big Hero 6 had the most females working in STEM, and includes the most STEM fields in the movie. Big Hero 6 is a science centered movie and is about friends from a university that offer different scientific courses. Honey Lemon is majoring in chemical engineering and Go Go Tomago is a (mechanical) engineering student. Abigail Callaghan is a pilot in the movie and thus fits in the STEM field of aeronautical science and aerospace engineering. The coding scheme from Steinke & Tavarez does not include these fields. However, Abigail also fits in the STEM field ‘robotics/technology’ since she engages in robot-fighting and has a clear interest in technology.

The movie WALL-E represents several STEM fields such as computer science, engineering, astronomy, aerospace science and robotics/technology. However, there is only one female character, EVE, working in one of these STEM fields. EVE fits in the category of robotics and technology. She is a robot that uses her technological advancements to detect signs of life on earth.

After Big Hero 6, the movie Atlantis: the lost empire, has the most female characters working in STEM. Audrey Ramirez is a chief mechanic and has majored in engineering. She is responsible for repairing vehicles and machinery on the mission to find Atlantis. Wilhelmina Bertha Packard the chief communications officer and is responsible for picking up radio signals and messages from outside.

This job fits in the category of computer science. Wilhelmina is always seen working behind a computer.

In the movie Tarzan, Jane Porter is the only female character. Jane works as a primatologist. She travels to Africa to study the behavior of gorillas. This specialty fit in to the STEM field category of biology.

### Female STEM Characters by Professional Status

Professional Status	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Lead Researcher	0	0	0	0	0 (0%)
Member of Research Team	1	0	2	1	3 (50%)
Research Assistant	0	0	0	0	0 (16,7%)
Student	2	0	0	0	2 (33,3%)
Other	0	1	0	0	1 (16,7%)
<b>Total</b>	<b>3 (42,8%)</b>	<b>1 (14,3%)</b>	<b>2 (28,6%)</b>	<b>1 (14,3%)</b>	<b>7 ( 100%)</b>

Table 4.5: Female STEM Characters of the movies under study categorized by Professional Status

The data from table 4.5 reveals that there are no females represented as a lead researcher in the movies. This indicates the lack of representation of women in scientific leadership positions. 50% of the female characters in these Disney movies were represented as members of a research team. It is encouraging to see that these females are a part of a team, rather than assistants of a research team. None of the females were represented as a research assistant. This indicates that the females did not only have a supporting role in science. 33,3% of the females were still students. Representing female students in STEM fields can encourage young girls to choose for a major in science.

### Female STEM Characters by Characterization

Characterization	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Professional</b>	3	1	1	N/A	5 (83,3%)
<b>Mad/maniacal</b>	0	0	0	N/A	0
<b>Clumsy /absentminded</b>	0	0	0	N/A	0
<b>Nerdy/geeky</b>	0	0	0	N/A	0
<b>Loner, antisocial, socially awkward</b>	0	0	1	N/A	1 (16,6%)
<b>Total</b>	3 (50%)	1 (16,7%)	2 (33,3%)	0 (0%)	6 (100%)

Table 4.6: Female STEM Characters of the movies under study by Characterization

The data from table 4.6 shows that 83,3% of the females working in STEM fields were portrayed as professional. This indicates that they are depicted as competent for their jobs which is positive for the representation of females working in STEM. This also shows that they were not portrayed as the stereotypical scientists. Overall, the female characters promoted positive representations of females working in STEM. Only one female (Wilhelmina Bertha Packard) was portrayed as a bit of a loner as she acted more distanced towards the other research members. She is portrayed as old with quirky habits. Jane Porter from the movie Tarzan did not fit any of these categories. Jane does not represent professional behavior as she is distracted from her mission by love. Next to this, we do not see Jane busy with working either as she pays all her attention to Tarzan.

### Female STEM Characters by Appearance

Appearance	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Attractive</b>	3	0	1	1	5 (71,4%)
<b>Glamorous/Sexy</b>	0	0	0	0	0 (0%)
<b>Unattractive/ geeky /nerdy</b>	0	1	1	0	2 (28,6%)
<b>Total</b>	3 (42,9%)	1 (14,2%)	2 (28,7%)	1 (14,2%)	7 (100%)

Table 4.7: Female STEM Characters of the movies under study categorized by Appearance

The majority of the female STEM professionals (71,4%) are portrayed as attractive. This aligns with the tendency of representing physical attractiveness in movies. The data reveals that 28,5% of the women were portrayed as unattractive/geeky/nerdy. Including females that are not

attractive challenges the traditional Western beauty standards but can also contribute to the stereotype of a geeky scientist. It is important to include diverse portrayals of female scientists.

### Female STEM Characters by Hypersexualization

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Hypersexualization</b>	0	0	0	0	0 (0%)
<b>Sexualized attire or partially naked</b>	0	0	0	1	1 (12,5%)
<b>Regular/modest attire</b>	3	1	2	1	7 ( 87,5%)
<b>Total</b>	3 (37,5%)	1 (12,5%)	2 (25%)	2 (25%)	8 ( 100%)

Table 4.8: Female STEM Characters of the movies under study categorized by Hypersexualization

Table 4.8 shows that none of the female characters were hypersexualized. This is positive as it avoids the objectification of female scientists. 12,5% of the females wore somewhat sexualized attire. Even though this number is relatively low, it remains important that sexy looks do not distract from the characters' scientific role and skills. Most females (87,5%) wore regular/modest attires. This can be interpreted as positive since it ensures that characters are presented in a manner that focuses on their professional roles and abilities instead of looks. The presence of a few characters with sexualized attires is already concerning as it contributes to objectification. Producers should focus on characters' professional abilities to set positive role models for girls.

### Female STEM Characters by Romantic Status

Romantic Interest	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Married</b>	0	0	0	0	0 (0%)
<b>In a relationship</b>	0	0	0	2	2 (28,6%)
<b>Considering relationship</b>	0	0	0	0	0 (0%)
<b>Focus of romantic interest/Not reciprocated</b>	0	0	0	0	0 (0%)
<b>Not in a relationship</b>	3	0	2	0	5.(71,4%)
<b>Cannot determine</b>	0	0	0	0	0 (0%)
<b>Total</b>	3 (42,8%)	0 (0%)	2 (28,6%)	1 (14,3%)	7 (100%)

Table 4.9: Female STEM Characters of the movies under study categorized by Romantic Status

Table 4.9 shows that none of the females working in STEM were married. The majority of these females (71,4%) were not in a relationship. 28,6% of the females were in a relationship. The data suggests that for most of the characters their professional roles were emphasized as they were not shown in a romantic narrative. This allowed their achievements and skills to take center stage. Even though the character EVE is in a relationship, the movie does also focus on her abilities and her strength. However, for the character of Jane Porter this is less the case. In the movie Tarzan I did not see a lot of Jane’s scientific skills as the movie was rather focused on the romantic narrative.

### Female STEM Characters by Parental Role

Parental Role	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Parent/guardian</b>	0	0	0	0	0 (0%)
<b>Former parent/guardian</b>	0	0	0	0	0 (0%)
<b>No children</b>	3	1	2	1	7 (100%)
<b>Total</b>	3 (42,8%)	1 (14,3%)	2 (28,6%)	1 (14,3%)	7 (100%)

Table 4.10: Female STEM Characters of the movies under study categorized by Parental Role

None of the female characters working in STEM were portrayed as a (former) parent or (former) guardian. Not portraying the characters as caregivers can lead to the audience assuming that

parenthood barriers a career in science. Movies should include female scientist who are mothers, as well as female scientists who are not mothers. By representing both motherhood and non-motherhood, movies can help to challenge societal biases and to promote inclusivity in STEM.

#### Number of times complimented on looks vs on skills

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Number of times complimented on looks</b>	0	0	0	0	<b>0 (0%)</b>
<b>Number of times complimented on skills</b>	2	0	2	0	<b>4 (100%)</b>
<b>Total</b>	<b>2 (50%)</b>	<b>0</b>	<b>2 (50%)</b>	<b>0</b>	<b>4 (100%)</b>

*Table 4.11: Number of times female STEM characters from the movies under study were complimented on looks vs numbers of times complimented on skills*

Overall, there were not a lot of compliments given to the females working in STEM in Disney animated movies. However, the compliments that were given were all about the females' skills and not looks. In the movies Big Hero 6 and Atlantis: the lost empire, the females were complimented on their skills by males. This shows that their contributions to their respective scientific field was acknowledged by male characters. Furthermore, this shows a positive representation of female scientists with the emphasis on their competences and expertise, rather than their physical appearance. This way the recognition of women's capabilities in STEM fields are promoted.

### Masculine stereotypical characteristics

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Physically Strong</b>	2	1	0	0	2 (8,7%)
<b>Assertive</b>	1	1	0	0	2 (8,7%)
<b>Athletic</b>	2	0	0	1	3 (13%)
<b>Brave</b>	3	1	1	1	6 (26,1%)
<b>Independent</b>	2	1	2	0	5 (21,7%)
<b>Intellectual</b>	3	1	1	1	5 (21,7%)
<b>Total</b>	12 (52,2%)	4 (17,4%)	4 (17,4%)	3 (13%)	23 (100%)

Table 4.12: Coding scheme masculine stereotypical characteristics for the female STEM characters of the movies under study (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002))

The stereotypical masculine character that occurred the most for female scientists in the movies was bravery, followed by independence and intelligence. The female characters from Big Hero 6 had the most stereotypical masculine characteristics. Jane Porter, from the movie Tarzan, had the least stereotypical masculine characters. There was no movie that included a female scientist that did not have any stereotypical masculine characteristics. This indicated that the females were not portrayed as the stereotypical female.

### Feminine stereotypical characteristics

	Big Hero 6	WALL-E	Atlantis: The lost city	Tarzan	Total
<b>Physically weak</b>	0	0	1	1	2 (18,2%)
<b>Affectionate</b>	2	1	1	1	4 (36,4%)
<b>Sensitive</b>	0	0	0	1	1 (9,1%)
<b>Submissive</b>	0	0	0	0	0 (0%)
<b>Nurturing</b>	1	0	0	1	1 (9,1%)
<b>Dependent</b>	1	0	0	1	1 (9,1%)
<b>Total</b>	3 (27,3%)	1 (9,1%)	2 (18,2%)	5 (45,4%)	11 (100%)

Table 4.13: Coding scheme feminine stereotypical characteristics for the female STEM characters of the movies under study (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002))



The data in table 4.13 shows that affection was the stereotypical feminine trait that occurred most in the Disney movies analyzed. The most stereotypical feminine characteristics occurred in the movie Tarzan. The least stereotypical feminine characteristics occurred in the movie WALL-E. The characters from Big Hero 6 and WALL-E were portrayed as physically strong, while those from Atlantis and Tarzan were not. All movies included female scientists who showed affection. Big Hero 6 had the most females that showed affection. However, showing affection did not make the female characters less independent and capable. Only in the movie Tarzan a female scientist was portrayed as sensitive. The fact that none of the female scientists were portrayed as submissive is positive for the representation of women. In the movies Big Hero 6 and Tarzan there were female scientists who were nurturing and who were dependent on a male. Representing female scientists who are dependent on males makes them less good role models.

## **4.2 Qualitative research**

### *4.2.1 Big Hero 6*

#### **Character descriptions of female STEM professionals:**

##### **Honey Lemon**

Honey Lemon, one of the members of the Big Hero 6 team, is portrayed as an outgoing, kind, empathetic, caring, and intelligent young woman. She is studying chemistry at the San Fransokyo Institute of Technology. She also has a passion for fashion. One of Honey Lemon's defining traits is her creativity, which she uses to design and invent new weapons and gadgets for the team. The way she talks reminds me of the Disney princesses as she is chatty and optimistic. In terms of gender stereotypes, Honey Lemon does exhibit some traditionally feminine traits, such as her love of fashion and her nurturing personality. Furthermore, Honey Lemon is cheerful, supportive, and compassionate. She shows love and affection through physical touch. These stereotypical feminine traits are not presented in a way that undermines her intelligence or capabilities as a scientist and superhero. Rather, her fashion sense is portrayed as an extension of her creativity, and her empathy is an asset in the team's efforts to help others. Honey Lemon's appearance and fashion sense are also notable aspects of her character. She is often seen wearing bright colors and bold patterns, and her handbag doubles as a portable chemical lab. She is more girly than Go Go Tomago. Her gear is also more girly (pink and purple with a heart bag). She also wears skirts and heels, whereas Go Go Tomago does not.

### **Go Go Tomago**

Go Go Tomago, who is part of the Big Hero 6 team, is portrayed as an introverted tough, athletic, strong, and a no-nonsense young woman. She studies engineering at the San Fransokyo Institute of Technology. One of Go Go's defining traits is her love of speed and her proficiency in using her electromagnetic-powered wheels to move around. She is also portrayed as a skilled engineer, helping to design and build the team's technology. In terms of gender stereotypes, Go Go does break some traditional expectations for female characters. She is not portrayed as particularly emotional or nurturing, but rather as tough and independent. She dresses in practical clothing, and her hair is cut short. Some non-traditional female characteristics that Go Go Tomago possesses is independence. Furthermore, she is less optimistic, sarcastic, a dare devil/adrenaline junkie, and critical. However, she is sometimes shown to be affectionate towards her friends, which is a stereotypical female characteristic.

### **Abigail Callaghan**

Abigail Callaghan works as a pilot at Krei Technology. She is the daughter of Robert Callaghan, who is a world-famous roboticist and professor. Abigail is brave and dedicated to her job and to science. From a young age, Abigail participated in robot-fights. Furthermore, she has always been very interested in technology. Abigail Callaghan plays a minor role in the Big Hero 6 movie.

**Analysis of visual appearance of female STEM professionals:**


Female characters working in STEM from Big Hero 6	Visual appearance, Outfit 1	Visual appearance, Outfit 2
<p><b>Honey Lemon</b></p>	 <p><i>Honey Lemon in her daily outfit</i></p>	 <p><i>Honey Lemon in her superhero outfit</i></p>
<p><b>Go Go Tomago</b></p>	 <p><i>Go Go Tomago in her daily outfit</i></p>	 <p><i>Go Go Tomago in her superhero outfit</i></p>
<p><b>Abigail Callaghan</b></p>	 <p><i>Abigail in her work outfit</i></p>	

Table 4.14: Visual appearance of female characters working in STEM from Big Hero 6

Honey Lemon has a very feminine look and is portrayed as attractive. She wears bright colors that reflect her colorful personality. She also wears accessories that are associated with femininity such as earrings, heels, a hairband, and a bag. She is attractive according to the Western beauty standards as she is tall, skinny, has large green eyes and long blond hair. Her appearance has similarities with Rapunzel. Honey Lemon is attractive, but does not wear sexualized attire, nor is she partially naked.

Go Go Tomago has less of a feminine look, and more of an athletic and edgy look. She is attractive but does not fit the Western beauty standards as she is short, and has short, spikey, and dark hair. It is notable that her superhero outfit accentuates her curves and makes her look taller and skinnier. Furthermore, she also has a sultrier look on her face while wearing her superhero outfit.

Abigail Callaghan is also portrayed as attractive according to the Western beauty standards. She is tall, skinny, has medium long brown hair and big green eyes. In the movie she is seen wearing a tight white suit with a helmet.

**Qualitative analysis of movie content:**

Feminist theme	Theme description	Supporting quotes and illustrations from Big Hero 6
<p><b>Transcending patriarchal expectations</b></p>	<p><i>“A heroine rebels and breaks through patriarchal expectations, and through hard work and persistence, she achieves self-actualization”.</i></p>	<ul style="list-style-type: none"> <li>● In the ‘nerd’ lab at the university of Hiro’s brother, there are more males (8) than females (2) present. This shows that STEM fields are dominated by males. However, during the science fair there are also lots of women present.</li> <li>● <b>00:10:25</b> Fred explains that he wants Honey Lemon to create a formula for him that can turn him into a fire-spitting lizard. This shows that he is dependent on a woman for this project. However, Honey Lemon refuses to work on this because she does not consider the purpose of the project as a contribution to science. This scene shows that Honey Lemon goes against a male to stay true to her own beliefs. This also shows persistence.</li> <li>● Professor Robert Callaghan’s daughter, Abigail, was very interested in robot fights when she was younger. This shows that women can be interested in male-dominated fields from a young age on as well.</li> <li>● <b>00:16:21</b> Hiro is quite nervous for the showcase. Honey Lemon tries to support him and talks courage into him. Honey Lemon asks Go Go Tomago to also encourage Hiro. Go Go Tomago responds with ‘Stop whining. Women up’. The usual saying is ‘Man up’, Go Go Tomago embraces womanhood by saying ‘Woman up’.</li> <li>● <b>01:24:26</b> Hiro and Baymax save Abigail who is in danger. The fact that Abigail needs to be saved by a man at the end of the movie shows similarity to older Disney movies in which female characters are dependent on men for their savior.</li> </ul>
<p><b>Rejection of domestication</b></p>	<p><i>“Emancipation from the role of the domesticated woman”.</i></p>	<ul style="list-style-type: none"> <li>● Neither Honey Lemon, Go Go Tomago, nor Abigail Callaghan are ever shown in their household. They are shown in the lab or outside</li> </ul>

		of their homes
<b>Appropriating masculine attributes and roles</b>	<i>“Heroines adopt traits that are deemed masculine by wider society, and this is frowned upon”.</i>	<p>The movie Big Hero 6 presents a feminist message of appropriating masculine attributes and roles through the character of Honey Lemon, Go Go Tomago, and Abigail Callaghan.</p> <p><b>Honey Lemon</b></p> <ul style="list-style-type: none"> <li>• Honey Lemon is portrayed as intelligent, confident, and capable. She is a skilled chemist, and her expertise in these traditionally male-dominated fields is celebrated and valued by her male teammates.</li> <li>• In addition to her technical skills, Honey Lemon is shown as being physically strong and athletic, and she often uses her strength and agility to help the team during fights and battles.</li> <li>• Honey Lemon is also shown as being brave and courageous, actively putting herself in danger to protect others.</li> <li>• Honey Lemon's feminine appearance and fashion sense are not portrayed as a hindrance to her ability to perform in traditionally masculine roles. Instead, she embraces her femininity and incorporates it into her superhero persona.</li> <li>• <b>00:09:29</b> Honey Lemon shows Hiro her work. She is excited and confident about what she has created. By being confident, her character is not portrayed as the stereotypical female.</li> <li>• <b>01:20:15</b> Honey Lemon saves herself from a difficult situation all by herself. This shows bravery and courage, which are traditionally male characteristics.</li> </ul> <p><b>Go Go Tomago</b></p> <ul style="list-style-type: none"> <li>• Go Go Tomago is shown as being highly skilled in mechanics, a traditionally male-dominated field, and her expertise is integral to the team's success.</li> <li>• Go Go Tomago is shown as being physically strong, athletic and agile, and she often uses her physical abilities to help the team during fights and battles.</li> <li>• Go Go Tomago's love of speed is also highlighted, as she rides a high-tech, super-fast bike as her mode of transportation. A love of speed is deemed more masculine by society.</li> <li>• Go Go Tomago's tough and independent personality is another way in which she appropriates masculine attributes.</li> </ul>

		<ul style="list-style-type: none"> <li>● Go Go Tomago is often the first to speak up when she disagrees with something.</li> <li>● <b>00:08:12</b> Go Go is not happy with the speed of her electro bike yet, even though it is very fast already and others are already impressed. This shows her competence of being critical.</li> <li>● <b>00:48:45</b> Go Go Tomago is fed up with the way Wasabi drives during the car chase. She says, ‘That’s it’ and takes over the wheel. This shows that women can drive well too, and that she takes the lead because she thinks she can do it better. This indicates determination and leadership skills.</li> <li>● <b>00:55:23</b> Go Go Tomago shows independence by not wanting Hiro’s help with trying out her new gear.</li> </ul> <p><b>Abigail Callaghan</b></p> <ul style="list-style-type: none"> <li>● Abigail has an interest in technology and bot-fighting, which are both male-dominated fields.</li> <li>● <b>01:05:50</b> Abigail shows bravery by being the first one who tests the new portal at Krei Technology. It is not clear where the portal will transfer her to, but she still takes the risk so the others can find out. This also shows her dedication to her job and to science.</li> </ul>
<p><b>Reframing the meaning of true love</b></p>	<p><i>“Heroines make their own romantic choices and reframe the meaning of “true love” beyond romantic pairings”.</i></p>	<ul style="list-style-type: none"> <li>● Big Hero 6 is focused on family bonds and platonic relationships. The bond between Hiro and his brother Tadashi is mainly highlighted. Furthermore, the relationship between Hiro and Tadashi’s creation, Baymax, is highlighted as a prime example of true love.</li> <li>● <b>01:27:22</b> Baymax’s devotion to Hiro is demonstrated when he risks his own life to save Hiro from danger, showing that true love can be found in non-romantic relationships.</li> <li>● The movie also features a diverse group of characters, including female characters who have their own unique story lines and are not defined solely by their romantic relationships with male characters. The friendship between the other members of the Big Hero 6 team is based on mutual respect and shared goals rather than romantic attraction.</li> <li>● None of the characters in the movie is either married or in a relationship. Thus, in this movie, the meaning of true love is reframed beyond romantic pairings</li> </ul>

Table 4.15: Analysis of feminist themes for Big Hero 6 according to the framework of Schiele et al. (2022)

#### 4.2.2 Wall-E

##### Character descriptions of female STEM professionals

### EVE

EVE (Extra-terrestrial Vegetation Evaluator), a female robot from the Disney Pixar movie WALL-E, is designed to detect signs of life on Earth. She is portrayed as unapproachable, focused, intelligent, and resourceful. She communicates with beeps and electronic sounds but learns to communicate with humans and other robots. As the story progresses, EVE shows herself to be very loyal and protective of WALL-E, the film's protagonist, and develops an emotional attachment to him. Even though she is a robot, she can experience emotions. Overall, EVE is a complex and engaging character with a strong sense of purpose and capacity for love and empathy.

##### Analysis of visual appearance of female STEM professional:


Female character working in STEM from WALL-E	Visual appearance
<p style="text-align: center;"><b>EVE</b></p>	 <p style="text-align: center;"><i>EVE in her daily outfit</i></p>

Table 4.16: Visual appearance of female character working in STEM from WALL-E

As EVE is a robot, I have put her in the category of having a geeky/nerdy appearance in the quantitative analysis. EVE's design is simple and minimalist, which is in contrast to stereotypical feminine looks with lots of accessories.

**Qualitative analysis of movie content:**

Feminist theme	Theme description	Supporting quotes and illustrations from WALL-E
<p><b>Transcending patriarchal expectations</b></p>	<p><i>“A heroine rebels and breaks through patriarchal expectations, and through hard work and persistence, she achieves self-actualization”.</i></p>	<ul style="list-style-type: none"> <li>● EVE, chooses to pursue her own mission. EVE's character arc in the movie shows how women can transcend the limitations of patriarchal expectations and embrace their strength and independence. Through EVE's character, the movie challenges traditional gender roles and expectations.</li> <li>● <b>01:13:25</b> EVE shows her strength by protecting WALL-E from danger and taking charge when needed. In contrary to older Disney movies, this movie shows that women do not always need to be saved by a man.</li> <li>● <b>01:14:46</b> EVE disobeys and decides to not complete her directive.</li> </ul>
<p><b>Rejection of domestication</b></p>	<p><i>“Emancipation from the role of the domesticated woman”.</i></p>	<ul style="list-style-type: none"> <li>● EVE, who is sent from Axiom to Earth, meets WALL-E. She ends up not wanting to go back to Axiom and rather wants to stay with WALL-E on Earth. This becomes clear in the scene of <b>01:14:46</b> when EVE disobeys her directive and decides to try to get everyone back to Earth. However, she also decides to do this because humans belong on Earth and not only because she wants to stay with WALL-E. Overall, EVE decides to leave Axiom and thus rejects domestication. The people and robots are kept at Axiom, while live on Earth is possible again. Thus, they were held hostage in Axiom.</li> </ul>
<p><b>Appropriating masculine attributes and roles</b></p>	<p><i>“Heroines adopt traits that are deemed masculine by wider society, and this is frowned upon”.</i></p>	<ul style="list-style-type: none"> <li>● EVE is designed to be a powerful and advanced robot. Her technical abilities are typically associated with masculinity. The movie also challenges traditional notions of femininity and beauty. EVE's design is simple and minimalist, which is in contrast to stereotypical feminine looks with lots of accessories.</li> <li>● EVE is shown to be just as capable, if not more so, than the male characters in the movie, including WALL-E. Through EVE's character, the movie sends a message of gender equality and encourages women to embrace their strength and independence.</li> <li>● The movie also challenges traditional gender roles and expectations by portraying WALL-E, a male robot, as a nurturing and caring character. WALL-E is portrayed as more caring and nurturing than EVE. WALL-E's character is different from the traditional male role that is dominant and aggressive. Instead, WALL-E is embodying characteristics such as compassionate, tenderness, and empathy.</li> </ul>



		<ul style="list-style-type: none"> <li>● <b>00:26:22</b> EVE tries dancing with WALL-E, but she is too strong which leads to EVE hurting WALL-E and him breaking a few things. This scene shows that EVE is stronger than Wall-E.</li> <li>● <b>00:29:22</b> EVE is not working anymore. WALL-E becomes the caretaker and is determined to try everything to make EVE better again.</li> <li>● <b>00:34:03</b> WALL-E follows EVE back to her home. He has gotten attached to EVE during their time together on Earth. He does not want her to leave and is worried about her.</li> <li>● <b>00:43:00</b> WALL-E follows EVE all the way through the crowd so he can be with her when she goes to the robot hospital. This shows that he is caring and supportive.</li> </ul>
<p><b>Reframing the meaning of true love</b></p>	<p><i>“Heroines make their own romantic choices and reframe the meaning of “true love” beyond romantic pairings”.</i></p>	<ul style="list-style-type: none"> <li>● This movie focus on romantic relationships. Mainly between WALL-E and EVE, even though robots are known for not having emotions. They are shown kissing and hugging in the movie. The heroine, in this case EVE, does make her own romantic choices. The movie does not focus on any platonic friendships.</li> <li>● <b>00:07:55</b> WALL-E is watching a couple dancing on television, he watches them with excitement. The look on his face tells that he has the desire to have a romantic relationship as well.</li> <li>● <b>01:01:00</b> This movie has few speaking roles. Mary and John, who are one of the few characters that speak, end up getting into a romantic relationship. This indicates that the movie is not reframed beyond romantic pairings.</li> <li>● <b>01:28:37</b> EVE kisses WALL-E. True love’s kiss makes WALL-E better.</li> </ul>

Table 4.17: Analysis of feminist themes for WALL-E according to the framework of Schiele et al. (2022)

### 4.2.3 Atlantis: The Lost Empire

#### Character descriptions of female STEM professionals

##### **Audrey Rocio Ramirez**

Audrey is a young, but highly intelligent mechanic. Furthermore, she is tough, determined, confident, capable, courageous, and has a no-nonsense attitude. Audrey is also independent and self-sufficient, often relying on her own skills and ingenuity to solve problems. Furthermore, she is intelligent and resourceful, and is not afraid to get her hands dirty. She is not easily intimidated, also not by much

older men, which is quite rare during 1914. During the expedition, Audrey is responsible for maintaining the submarine. Despite being tough, Audrey is also caring and loyal to those she considers her friends. She becomes friends with Milo Thatch and is willing to risk her own life to help him and the rest of the crew to save the lost empire of Atlantis.

### **Wilhelmina Bertha Packard**

Wilhelmina Bertha Packard is a senior radio operator who has a tendency towards sarcasm and cynicism. As the communications officer of the research team, Mrs. Packard is responsible for relaying messages and monitoring radio signals. During her job, she is often shown chatting with friends on the phone or taking photographs. Her facial expressions convey determination and a no-nonsense attitude. Some of Wilhelmina's peculiarities are highlighted, including her weird sleeping habits and her tendency to take pictures of whatever catches her attention. Although she doesn't play a direct role in the battle to save Atlantis, she supports Milo and fights alongside him against Commander Rourke. She is lauded for her bravery in the mission and returns to the surface with a crystal from the lost empire, which she proudly displays on her hat. Overall, Mrs. Packard has a unique personality and brings a sense of humor into the movie.

**Analysis of visual appearance of female STEM professionals:**

Female characters working in STEM from Atlantis: the lost empire	Visual appearance, Outfit 1
<p><b>Audrey Ramirez</b></p>	 <p><i>Audrey Ramirez in her daily outfit</i></p>
<p><b>Wilhelmina Bertha Packard</b></p>	 <p><i>Wilhelmina in her daily outfit</i></p>

Table 4.18: Visual appearance of female characters working in STEM from Atlantis: the lost empire

Audrey her ethnicity is Latin-American, and she has dark skin and short dark hair. The producers portrayed Audrey as a tomboy as she wears a dungaree and a hat. The dungaree is also a suitable outfit for a mechanic which shows that she is practical. She does look attractive, but she does not entirely pass for the Western beauty standard. However, she does have big eyes and big red lips which are depicted as attractive features according to the Western beauty standards.

Wilhelmina is portrayed older woman. She has grey hair and wrinkles and is not portrayed as attractive according to the Western beauty standard. She has some excessive features such as a big nose. Being old with excessive features are typically used for the portrayal of villains in Disney movies. Wilhelmina is always seen wearing a uniform with a long coat, which is a practical and conservative outfit. Moreover, she is always seen with a cigarette in her hand.

**Qualitative analysis of movie content:**

Feminist theme	Theme description	Supporting quotes and illustrations from <i>Atlantis: The lost empire</i> :
<p><b>Transcending patriarchal expectations</b></p>	<p>“A heroine rebels and breaks through patriarchal expectations, and through hard work and persistence, she achieves self-actualization”.</p>	<ul style="list-style-type: none"> <li>● All members of the board of the museum, who are decision-makers about the funds for scientific expeditions, are male. This indicates no transcending of patriarchal expectations.</li> <li>● Audrey, who is still a teenager, is the chief mechanic on a big mission. This shows that she has broken patriarchal expectations through hard work and persistence.</li> <li>● <b>00:12:36</b> While Jebidiah tells Milo about Audrey, he mentioned that Milo should not underestimate Audrey because of her age. This shows that Jebidiah is aware of Audrey’s skills and that he values her.</li> <li>● <b>00:21:10</b> Mrs. Packard is picking up a signal through the hydrophone and wants to tell this to Commander Rorke. She keeps calling ‘commander, commander’ a few times, but he intentionally ignores her and rather listens to Milo. He looks at her with a side eye and then looks back at Milo while he ignores her. She keeps calling him and eventually, he says ‘Yes, Mrs. Packard, what is it?’ with an annoyed voice and a frustrated look on his face. Mrs. Packard, a woman, is ignored and belittled by Commander Rorke, a man, despite her expertise and experience. This reinforces the stereotype that women are not taken seriously in male-dominated fields, such as science and technology. This scene also shows something about the gender dynamics and power structures during the expedition. Rorke's behavior towards Mrs. Packard can be interpreted as an example of toxic masculinity and male privilege, where men dismiss and silence women's voices to maintain dominance and control. This scene also reflects the power balance between genders in society during that time (1914).</li> <li>● <b>00:30:53</b> The excavator is broken. Audrey, who is Chief Mechanic, is trying to fix the excavator. She must go get some tools in order to do this. While she walks away, she asks Milo to not touch anything while she is gone. Milo disobeys and fixes the excavator. Milo fixes something that can usually only be fixed by someone with Audrey’s expertise (a mechanic). This scene challenges the stereotype that men are naturally better at technical or mechanical tasks than</li> </ul>

		<p>women. This scene also shows no transcending patriarchal expectations.</p> <ul style="list-style-type: none"> <li>● <b>00:34:45</b> Audrey explains to Milo how she became Chief Mechanic for the multimillion-dollar mission that they are on. Her father always wanted sons, one to run his machine shop and one to become a boxing champion. This can indicate that she does this job to live up to her father’s expectations. However, it also indicates that she has proven her dad that a woman can do the same thing man can do. Same goes for her sister who will get a boxing title.</li> <li>● <b>01:08:30</b> Audrey says, ‘This is wrong and you know it’ to Mr. Harcourt’. She calls him out on exploiting the people of Atlantis in order to make money.</li> </ul>
<b>Rejection of domestication</b>	“Emancipation from the role of the domesticated woman”.	<ul style="list-style-type: none"> <li>● None of the characters, also not female characters, are shown in their own homes. In fact, the female characters are being brave by leaving their home for the mission.</li> </ul>
<b>Appropriating masculine attributes and roles</b>	“Heroines adopt traits that are deemed masculine by wider society, and this is frowned upon”.	<ul style="list-style-type: none"> <li>● By looking at Audrey’s outfit, which exists out of a dungaree and a hat, I assume that the filmmakers wanted her to appear as a ‘tomboy’, since she has an interest in engineering which is a male-dominated field.</li> <li>● <b>00:19:33</b> Milo talks about a dangerous monster from Atlantis and then accidentally shows a picture of his younger self instead of the monster. Audrey responds that she used to take lunch money from guys like Milo. This indicates that she is quite tough and not afraid.</li> <li>● <b>00:22:35</b> Audrey shows courage by helping with stopping the water from getting into the ship.</li> <li>● <b>01:13:22</b> Audrey says ‘Come on. We better make sure he doesn’t hurt himself’. She says this somewhat annoyed. However, his shows that she eventually is supportive, and it also shows bravery.</li> <li>● <b>01:17:32</b> Audrey fails to see the chain which contribute to the female stereotype of not being strong.</li> </ul>
<b>Reframing the meaning of true love</b>	“Heroines make their own romantic choices and reframe the meaning of “true love” beyond romantic pairings”.	<ul style="list-style-type: none"> <li>● Neither Audrey nor Wilhelmina has any romantic interest. However, the movie does focus on the romantic relationship between Milo and Kida. Although not friends, but rather colleagues in the beginning, Milo does become friends with the other team members. However, the meaning of true love is not reframed beyond romantic pairings.</li> </ul>

Table 4.19: Analysis of feminist themes for *Atlantis: The lost empire*, according to the framework of Schiele et al. (2022)

#### 4.2.4 Tarzan

##### Character descriptions of female STEM professionals

##### Jane Porter

Jane Porter is a young and adventurous primatologist from England who has come to Africa with her father to study the wildlife and ecology of the continent. Jane is intelligent, curious, and passionate about her work. She is knowledgeable about the natural world. Her curiosity is matched by her enthusiasm and love for adventure, which often leads her into dangerous or exciting situations. Furthermore, Jane also has a passion for drawing. Jane is also compassionate and caring towards others. She is open-minded and accepting of people from different backgrounds, which allows her to form meaningful connections with the people and animals she encounters in Africa. Her kindness and empathy make her a beloved character in the movie. Throughout the movie, Jane undergoes a transformation as she becomes more connected to the natural world and to Tarzan.

##### Analysis of visual appearance of female STEM professional:





Female character working in STEM from Tarzan	Visual appearance, outfit 1	Visual appearance, outfit 2	Visual appearance, outfit 3	Visual appearance, outfit 4
Jane Porter	 <i>Jane in formal wear</i>	 <i>Jane in her first jungle outfit</i>	 <i>Jane in her second jungle outfit</i>	 <i>Jane in her third jungle outfit</i>

Table 4.20: Visual appearance of female character working in STEM from Tarzan

Jane Porter's appearance is influenced by the Victorian era, which reflects the time in which the story is set. Jane fits the Western beauty standards as she is tall, skinny, has long brown hair, fair skin, and big green eyes. Overall, she looks sophisticated and elegant. In the movie she wears four different outfits. The first outfit is a yellow dress that is a typical dress from the Victorian era. This outfit is not a very practical for the jungle and portrays the stereotypical British woman that must look

elegant all the time. Later, Jane switches her dress for a yellow blouse with a long green skirt and is barefoot. She also stops wearing her hair up, but still wears a clip in her hair. After being in the jungle for a while, Jane again switches her outfit to a white tank top and a brown long skirt with a high split that shows almost her whole leg. At this point she is wearing her hair all the way down. Her last outfit seems a bit sexualized as she is wearing a short skirt with a small split and a crop top. Her outfit becomes more adapted to life in the jungle throughout the movie. The more adapted the outfit, the more skin is showed. All her outfits are either a dress or skirts. It looks like the producers wanted Jane to still look feminine while living in the jungle, even though this might not be the most practical.

**Qualitative analysis of movie content:**

Feminist theme	Theme description	Supporting quotes and illustrations from Tarzan
<p><b>Transcending patriarchal expectations</b></p>	<p><i>“A heroine rebels and breaks through patriarchal expectations, and through hard work and persistence, she achieves self-actualization”.</i></p>	<ul style="list-style-type: none"> <li>● Jane transcends patriarchal expectations through her career as a scientist. She is intelligent and knows a lot about biology and zoology. She is passionate and excited about studying the animals of Africa. This challenges the stereotype that women are not as intellectually capable as men and reinforces the idea that women can excel in STEM fields and especially because a career in science was not a suitable profession for women during the time period in which the film is set (Victoria-era).</li> <li>● Jane is a woman ahead of her time, with a passion for exploration that sets her apart from the more traditional female characters from Disney movies during that time (2001).</li> <li>● <b>00:35:28</b> Tarzan keeps saving Jane from the monkeys as well from the obstacles she is facing while being followed by the monkeys. Thus, Jane has to rely on a man in order to become safe. This shows no transcending patriarchal expectation.</li> <li>● <b>00:48:29</b> Jane says to her father ‘Think of what we can learn from him’. With ‘him’ she is referring to Tarzan. This indicates that Jane is eager to learn. Clayton interferes during this scene. With an annoyed voice he says to Jane’s father ‘Oh! Professor, you are here to find gorillas, not indulge some girlish fantasy’. This shows that Clayton is not believing that Jane has found a human that behaves like an ape. The fact that he says ‘girlish fantasy’ makes it sounds as if only females can make up stories in their minds, which shows that he thinks that women are less noble than men.</li> <li>● Jane is a drawing talent. During the movie her passion for drawing is more prominently shown than her passion for science.</li> <li>● Jane possesses an exceptional ability to accurately depict animals or even humans like Tarzan on her sketch board with remarkable detail and relative</li> </ul>

		<p>ease. While she usually works from a reference, her depiction of Tarzan was solely based on memory, which showcases her extraordinary talent, great memory, and thus intelligence.</p> <ul style="list-style-type: none"> <li>● Jane is wearing a fancy dress on an expedition in the jungle. Later on, she changes to a simpler outfit consisting of a top and a skirt. However, this might not be the most comfortable outfit for an expedition in the jungle. The makers of the film probably wanted Jane to appear feminine by letting her wear a dress and skirt instead of shorts. However, reason for Jane wearing dresses and skirts could also be that women during that time did not wear pants.</li> <li>● <b>00:55:51</b> Jane gets very emotional when Tarzan asks her to stay with him. She runs away crying. Clayton sees this and says to Tarzan 'Women...how typical'. This scene again shows that Clayton believes that all women have stereotypical feminine traits.</li> <li>● Jane demonstrates her intelligence and resourcefulness to the research by adapting to life in the jungle and teaching Tarzan about humans and the English language.</li> </ul>
<p><b>Rejection of domestication</b></p>	<p><i>"Emancipation from the role of the domesticated woman"</i>.</p>	<ul style="list-style-type: none"> <li>● As Jane has travelled all the way from England to Africa, she is not shown as a domesticated woman, but rather as adventurous and curious.</li> <li>● At the end of the movie Jane completely rejects domestication as she decides to go live with Tarzan in the Jungle.</li> </ul>



<p><b>Appropriating masculine attributes and roles</b></p>	<p><i>“Heroines adopt traits that are deemed masculine by wider society, and this is frowned upon”.</i></p>	<ul style="list-style-type: none"> <li>● Jane is not portrayed as independent as she is always with a male, either Tarzan, Clayton or her father.</li> <li>● <b>00:46:21</b> Jane tells her father how she was saved. She tells this as if she is in love. Jane is very impressed with Tarzan, and with his eyes. Jane gets shy around Tarzan. This shows more feminine characteristics.</li> <li>● Jane is sweet and caring towards the animals which is a stereotypical female characteristic.</li> <li>● <b>01:02:09</b> Jane, her father and Clayton are attacked by Kerchak. While her father and Clayton want to run, she still looks behind and says ‘Wait, wait! Tarzan’. This shows that she has become attached to Tarzan and shows that she is a caring person.</li> <li>● <b>01:13:52</b> Jane tries to save a caged gorilla on her own. However, Tarzan comes a long and saves the day himself by helping Jane to open the cage.</li> <li>● <b>01:15:52</b> Jane wants to save a monkey that the humans have caged and want to bring to England for research. She swings on the vines and climbs trees which shows that she is athletic and brave. Being athletic and brave are stereotypical masculine traits.</li> </ul>
<p><b>Reframing the meaning of true love</b></p>	<p><i>“Heroines make their own romantic choices and reframe the meaning of “true love” beyond romantic pairings”.</i></p>	<ul style="list-style-type: none"> <li>● <b>01:20:00</b> After Jane’s father says ‘Jane, I have the feeling that you should stay. You love him’, Jane does feel confident to make the decision to stay. She was hesitating before because she felt like she belonged in England with the humans. This scene shows that Jane is not making her romantic decision completely by herself. She wanted her father’s approval first.</li> <li>● Tarzan and Jane’s relationship is based on mutual respect and admiration.</li> <li>● Jane is compromising quite a lot for Tarzan as she decides to stay with him. She leaves all her family, friends, (career)opportunities, and facilities for love.</li> </ul>

Table 4.21: Analysis of feminist themes for Tarzan according to the framework of Schiele et al. (2022)

### **4.3 Summary of quantitative and qualitative analysis per movie**

#### **4.3.1 *Big Hero 6***

In the movie *Big Hero 6* the female characters, Honey Lemon, Go Go Tomago and Abigail Callaghan all transcend patriarchal expectations by choosing to pursue a career in science which is a male-dominated field. In the *Big Hero 6* team and at the university there are more male than female students. In this science-focused movie, 60% of the cast is male. This mirrors the reality in which females are underrepresented in STEM fields. Honey Lemon and Go Go Tomago are in the co-lead of the movie as they are part of the *Big Hero 6* team, whereas Abigail has a secondary role. Honey Lemon and Go Go Tomago are students, while Abigail is a member of a research team. All three of them can be categorized as professional as they are not portrayed as stereotypical scientist who are mad/maniacal, nerdy, antisocial etc. All these females are portrayed as attractive women. Especially Honey Lemon, who is slim, tall, has long blonde hair and big eyes, fits the Western beauty standards that is often seen in media. The character Honey Lemon is the most ‘girly’ looking and is also the only female character that wears heels and skirts. All the females wore regular daily clothing. It is noticeable that Go Go Tomago looks more attractive and feminine in her superhero outfit. Her body is accentuated, and her legs appear longer and slimmer. However, in this movie the focus was more on intelligence and skills rather than appearance. The female characters are resourceful to the team and are valued by the other male team members.

In this movie there are several examples of transcending patriarchal expectations. The female characters are valued by the team and are respected. There is also a scene in which Fred says that Honey Lemon refuses to work with him. This shows that she decides herself what she wants to work on and that she goes against a male. It also shows that she can be critical. Go Go Tomago tells Hiro to ‘Woman up’, indicating that women are tough. With this remark she goes against the saying ‘Man up’ which shows transcending patriarchal expectations. However, the movie also shows the theme damsels in distress since Hiro and Baymax need to save Abigail Callaghan. This shows no transcending patriarchal expectations as Abigail’s needs to depend on men for their savior.

The female characters are not shown in traditional domestic roles, rejecting the stereotype of the domesticated woman. They are either shown outside or working in a laboratory. Based on the analysis provided, we can conclude that the female STEM characters in *Big Hero 6* challenge traditional gender stereotypes as they also have stereotypically masculine attributes. Honey Lemon also exhibits some more traditionally feminine traits, such as her love of fashion and her nurturing personality, but these traits do not undermine her intelligence or capabilities as a scientist and superhero. Instead, her fashion sense is portrayed as an extension of her creativity, and her empathy is an asset to the team's efforts to help others. On the other hand, Go Go Tomago is tough and independent, breaking the traditional expectation of female characters being emotional and nurturing. Both characters are highly skilled in their fields, and their strengths and abilities are celebrated and

valued by their male teammates. Abigail Callaghan a pilot with a passion for robot-fighting and an interest in technology. Abigail shows bravery by participating in experimental research and thus goes where no one has been before, which makes her challenge the traditional stereotypes. The movie also presents a feminist message of appropriating masculine attributes and roles. Honey Lemon and Go Go Tomago embody this message through their physical strength, being athletic, having technical skills, and bravery. The female characters working in STEM fields in this movie possess more stereotypical masculine traits than stereotypical feminine traits. Overall, Big Hero 6 challenges gender norms and provides positive and empowering role models for girls and women interested in STEM fields.

This movie focuses on family bonds and platonic relationships which reframes the meaning of true love. Even though the movie is about a group of friends existing from as well males as females there are no characters in a romantic relationship or considering this. None of the female STEM characters had children.

#### *4.3.2 WALL-E*

In the movie WALL-E most of the characters are male (66,7%). EVE, the female robot who is in the co-lead, is a character that to some extent challenges traditional gender roles and expectations. She transcends patriarchal expectations by pursuing her own mission and shows her strength by protecting WALL-E from danger and taking charge when needed. She disobeys her directive and decides to try to get everyone back to Earth. This challenges traditional gender roles and expectations, showing that women do not always need to be saved by a man. EVE's behavior can be categorized as professional, rather than one of the other stereotype of STEM workers such as mad/maniacal, nerdy/geeky, loner, antisocial etc. In the beginning, EVE was a loner and was not approachable. However, when she met WALL-E this changed. EVE her look is not feminine as she has a simplistic design with no other accessories. As she is a robot her appearance geeky/nerdy rather than attractive, glamorous, or sexy. Since the movie protagonists are robots who mostly communicate through sounds, there are not as many speaking lines as in other movies. Therefore, EVE does not get complimented on her looks nor on her skills. However, the movie focuses more on EVE her capabilities rather than her looks. EVE decides to pursue her own mission. She chooses to fight for something that she herself finds important which shows that she is transcending patriarchal expectations. Unlike other Disney movies, in this movie the male character WALL-E is saved by the female character EVE. Having a female character that is shown to be the strongest and most capable one is transcending patriarchal expectations. The movie also rejects the domestication of women. EVE decides to leave Axiom and stay with WALL-E on Earth. This decision shows that she is not bound by traditional expectations of domestication and is capable of making her own choices.

EVE is shown to have several masculine attributes. She is also shown to be more capable than the male characters in the movie, including WALL-E. WALL-E, on the other hand, is portrayed as a nurturing and caring character, challenging the traditional male role of being dominant and

aggressive. Even though EVE has lots of masculine attributes, she also becomes affectionate and caring throughout the movie. However, EVE has more stereotypical masculine characteristics than stereotypical feminine characteristics.

This movie focuses on the romantic relationship between WALL-E and EVE. However, the movie reframes the meaning of true love by allowing the heroine, EVE, to make her own romantic choices. The true love's kiss between EVE and WALL-E makes WALL-E better.

#### *4.3.3 Atlantis: The Lost Empire*

The movie *Atlantis: The Lost Empire* focuses on a research expedition to Iceland. Different science fields are important during this expedition. 66,6% of the cast were males, mirroring the reality of women being underrepresented in STEM fields. However, the few female characters working in STEM fields in the movie, challenge patriarchal expectations and norms to some extent. Both Audrey and Wilhelmina have important supporting roles as they are considered members of the research team. They are not in the lead or co-lead but have secondary roles. As well Audrey as Wilhelmina are portrayed as professional. Audrey is portrayed as a bit of a tomboy and the emphasis of her character is more on her skills than her looks. Wilhelmina is an older woman and is not portrayed as attractive. Wilhelmina looks more like a Disney villain. She is portrayed as old with excessive features, has a low tone voice and is always seen with a cigarette in her mouth. Neither Audrey, nor Wilhelmina are complimented on their looks during the movie.

The fact that the museum board does not include any women indicates no transcending patriarchal expectations. Audrey is a teenager, but also chief mechanic during the expedition. This shows that Audrey has transcend patriarchal expectations through hard work and persistence. Even though Audrey is a chief, she is not seen making important decisions on her own. Jebidiah warns Milo to not underestimate Audrey because of her young age indicating that he is aware of her skills and gives her credit for this. Audrey's father always wanted sons so that one of them could become a boxing champion and the other one could run the machine shop with him. By becoming chief mechanic, Audrey has lived up to her father's expectation but has also proven that women are just as capable as men for certain jobs. When arrived in Atlantis, Audrey stands up to Mr. Hartcourt by calling him out on his wrong intentions with the people from Atlantis. Rebellious against authority is also transcending patriarchal expectations. There are also scenes that show no transcending patriarchal expectations. In one scene, Mrs. Packard is intentionally ignored by commander Rorke. This shows that women are not always taken seriously, and it says something about the power dynamics on the expedition. In another scene Milo fixes the excavator, something that can usually only be fixed by Audrey, a mechanic. This scene supports that men are naturally better at technical or mechanical tasks than women. The film also portrays the rejection of domestication as none of the characters, including female characters, are shown in their own homes. The characters show bravery by joining an expedition to a place no one has ever been before.

The character Audrey, a skilled mechanic, is the chief mechanic on a scientific expedition, despite her young age. She is a tough and capable character who has an important role on the expedition. She is not afraid to stand up for what she believes in. Additionally, the character of Wilhelmina Bertha Packard, a senior radio operator, also contributes to the expedition's success. Both characters appropriate masculine attributes and roles such as independence. However, Audrey's backstory also suggests that she might have taken on her profession to live up to her father's expectations. Overall, the female characters in the movie challenge gender stereotypes and transcend traditional gender roles, promoting feminist values. The movie appropriates masculine attributes and roles, as Audrey adopts a tough exterior and is resourceful, and Wilhelmina uses sarcasm and cynicism. Wilhelmina does not have any stereotypical feminine characteristics. Audrey does become more affectionate toward Milo throughout the movie. A scene in which Audrey fails to saw the chain shows physical weakness.

The two women working in STEM fields do not have a relationship and no children. However, the movie does focus on another romantic pair.

#### *4.3.4 Tarzan*

The movie Tarzan only includes one woman in the movie, 75% of the cast were males. This shows the underrepresentation of women in research during that time. Jane, the co-lead in this movie, is a primatologist. She is intelligent, creative, and curious as she travels all the way from England to Africa with her father to study the wild animals. Jane is a member of the research team. Except for Jane, there were no other women on the expedition, also not for supporting roles. Jane can neither be categorized as professional nor as one of the stereotypical science professionals related characteristics such as mad, clumsy, nerdy, loner etc. In the movie we do not see that Jane is really doing research as she is rather focused on teaching Tarzan about the human world and keeps herself busy with drawing. During the movie, you do not get to see Jane's research or STEM related skills. Jane is portrayed as an attractive woman according to the Western beauty standards as she is young, slim, has a tiny waist, big blue eyes, fair skin and long brown hair. Jane has the typical Disney Princess look. In the movie she wears four different outfits. Throughout the movie her outfits adapt to live in the jungle. However, she always wears a dress or skirt which depicts the femininity of her character. Jane her last jungle outfit is quite sexualized as she wears a short top and short skirt with a split.

With a career in one of the STEM fields, Jane transcends patriarchal expectations, especially during the Victorian era. During the Victorian era, households were traditional as in that females stayed at home and males provided for their families. In contrary, Jane travels all the way to Africa which shows bravery. She is adventurous and is thus emancipates from the role of the domesticated women. In the end, Jane completely rejects domestication by deciding to stay with Tarzan in the jungle.

Jane somewhat challenges the stereotypical women who is often portrayed as not as intellectual and as capable as a man. In the movie Jane is often busy with drawing, The fact that she could draw Tarzan while she only saw him once, shows that she has a good memory which shows that she is intellectual. She also learns Tarzan the English language in a short amount of time which also shows that she is intelligent. During the movie, Clayton makes misogynist remarks towards Jane, and no one goes against this. In some scenes, Jane is portrayed as very feminine, while in other scenes she is shown to have some stereotypical male characteristics as well. Even though she has some stereotypical masculine traits such as being athletic and brave, Jane is not portrayed as an independent woman as she is always together with a male. Overall, Jane is not a traditional woman and does break the pattern of the domesticated women in earlier Disney movies. However, she has more stereotypical feminine characteristic traits than stereotypical masculine characteristic traits. Tarzan is still the hero of the movie as he comes through and keeps saving Jane and the other animals in times of need. Jane does not have any heroic moments by herself, and the movie has the damsel in distress theme.

The movie Tarzan does not reframe the meaning of true love as the movie focuses on the romantic relationship between Tarzan and Jane. Jane gives up her opportunities, family, and friends in England as she chooses love over them by staying with Tarzan in the jungle. However, she does not make this decision until she learns that her father supports her staying in the jungle with Tarzan.

## 5. Conclusion & Discussion

This last chapter includes the conclusion and discussion of the main findings, recommendations, limitations of this study, and suggestions for further research. In this chapter the following research question will be answered: *“How are females working in STEM occupations represented in animated Disney movies?”*.

The four movies, that included female characters working in STEM occupations, that were analyzed in this study are: Big Hero 6, WALL-E, Atlantis: The Lost Empire, and Tarzan. From these four movies, the following female characters with STEM occupations ( $n=7$ ) were analyzed: Honey Lemon, Go Go Tomago, Abigail Callaghan, EVE, Audrey Ramirez, Wilhelmina Packard, and Jane Porter. All the movies analyzed had a male protagonist. Males were dominating speaking roles with 66,6% for the Disney movies analyzed in this research. All the analyzed movies included more male than female characters. This finding agrees with the findings from studies such as from (Ahmed & Wahab, 2014), Steyer (2014), Azmi et al. (2016), and Walsh and Leaper (2020) about the underrepresentation of women in animated movies. Thus, gender imbalance remains a problem. The movie ‘Big Hero 6’ had the best male-female character ratio as 40% of all characters were female. Big hero 6 included the most female characters working in STEM fields. Tarzan had the worst male-female ratio as just 25% of the cast was female. It is notable that Tarzan, which scores the worst on male-female ratio is the oldest movie analyzed, while Big Hero 6, which scores the best on male-female ratio, is the newest movie analyzed. None of the female STEM characters in the four movies analyzed were the protagonist of the movies. In all movies, there were more males than females working in STEM occupations. Most of the female characters analyzed are working in engineering or technology. Steinke & Tavarez (2018) found that female characters involved in STEM fields are usually cast in secondary or co-lead positions in Hollywood movies. In the Disney movies analyzed, I noticed that this was the same as for the Hollywood movies. Most of the female STEM characters also were the co-lead and some were in secondary lead. There were also no female characters that had the lead in research. Thus, women in the analyzed Disney movies were not shown in leadership or decision-making roles.

Except for Wilhelmina Bertha Packard and Jane Porter, the other female characters working in STEM fields in the movies analyzed were categorized as professional rather than in the categories mad/manical, clumsy/absentminded, nerdy/geeky, loner/antisocial/socially awkward. Wilhelmina is portrayed as a bit loner and antisocial towards the other research members. Jane Porter does not fit any of the categories.

All the female characters are attractive, except for Wilhelmina Bertha Packard. Honey Lemon and Jane porter are portrayed as more ‘girly’ than the other female characters. Both Honey Lemon and Jane Porter are wearing skirts, heels, dresses, and other ‘girly’ accessories. They are also the

characters that have similarities to Disney Princesses. Go Go Tomago and Audrey are portrayed as the tough ones. Go Go her daily outfit is simple, while her superhero outfit makes her more feminine and more attractive according to the Western beauty standards. This could indicate that children that watch Disney movies can associate superhero traits such as being strong and athletic with the Western beauty standards of being tall and skinny. Audrey and Wilhelmina did not wear feminine outfits at all. Audrey is portrayed as a tomboy, and Wilhelmina is wearing a uniform. Research from Sink & Mastro (2017) found that females on television prioritize appearance as they are often evaluated on their looks. However, in the movies analyzed this was not the case. Honey Lemon was the only character that has an interest in fashion, but she does not prioritize her looks above her passion for chemistry and the team's mission. A study from Ward & Grower (2020) found that the stereotypical female in media emphasized the importance of beauty, thinness, physical appearance, and sexual attractiveness in determining the worth of girls and women. The movies analyzed showed that not only appearance, but also skills play part in determining the worth of the female characters working in STEM fields. The study of Steinke & Tavarez (2018) stated that the attractiveness of female STEM characters in Hollywood movies remained a focal point. Even though most females were attractive in the Disney movies analyzed, attractiveness was not the focal point of the female characters. They were also not complimented on their looks often. Except for Jane Porters third and fourth outfit, none of the female STEM characters were shown partially naked. It is noticeable that Tarzan, which is the oldest movie, is the only movie that includes a woman with a STEM profession with sexualized attire.

In contrast to the other three movies analyzed, Big Hero 6 does not focus on any romantic relationships at all. In this newest movie analyzed, the meaning of true love is portrayed beyond romantic relationships as it focuses more on a family bond and platonic relationships. None of the female STEM characters in the Disney movies analyzed had children, nor were they a guardian.

Bravery was the most occurring masculine stereotypical characteristic while analyzing the Disney female STEM workers. In the movies Tarzan and Atlantis, none of the females working in STEM were physically strong and assertive, in contrary to the female STEM workers in WALL-E and Big Hero 6. The female STEM professionals from the Big Hero 6 movie had the most stereotypical masculine traits which implies that they are not gender stereotyped. EVE, Audrey, and Wilhelmina were not portrayed with negative stereotypical feminine traits such as submissive or dependent. All of them, except for Wilhelmina were shown to be affectionate, but this is not portrayed in a way that undermines their skills. Jane from Tarzan has the most stereotypical feminine traits and has less stereotypical masculine traits compared to the characters from the other movies. She was also the only character that did not show any independence at all. This in combination with her sexualized attire implies that Jane is somewhat portrayed as the stereotypical female. None of the analyzed female characters were shown as domesticated women.

As a conclusion, most female characters working in STEM were not portrayed as the stereotypical scientists as described in research from (Cheryan, Master, & Meltzoff, 2015; Tan, Jocz,



& Zhai, 2015; Steinke et al., 2012). They were not portrayed as old, with crazy hair, social awkwardness, wearing glasses and lab coats, who work in isolation and are conducting experiments in a lab. They were rather portrayed as intelligent, brave, and adventurous. The female characters analyzed, were also not portrayed as the stereotypical female. Jane Porter is to some extent stereotyped. Jane possesses more stereotypical feminine than masculine characteristics and is not represented as independent. The movie focuses on the love story of Tarzan and Jane which overlooks her skills. The representation of female scientists varied in the movies analyzed. Some characters challenged gender stereotypes and transcended patriarchal expectations, while others conformed more to traditional gender roles. Overall, the movies represent positive role models as they also have stereotypical masculine traits and reject domestication. However, the movies also contain examples that reinforce gender norms and the damsels in distress theme. After analyzing the movies, it has become clear that Disney is trying to improve the representation of female scientists in its movies. Female scientists were represented in a more positive way in the newer movies than in the older movies.

Based on the results, Disney movies still have room for improvement. Disney, as a key industry player, can make a difference by increasing the number of female characters with STEM professions in their movies. The findings of this research are also interesting for other (children's) movie production companies, researchers and other advocates who aim to promote a diverse and empowering portrayal of women in STEM. This research contributes information to existing literature on the reinforcement of stereotypes related to gender and occupation. As the research addresses the problem of harmful representations, this will lead to producers improving the portrayal of women working in STEM in the media. This research will not only be helpful in improving media portrayal but will also create more awareness for making the STEM fields more inclusive, which will positively affect society on the long-term.

### **Recommendations for animated movie production companies**

The results showed that there is still a lack of diverse representation of female scientists in animated movies. Recommendations for movie production companies would be to include more female scientist to create a gender balance in the movies. Female scientist should also get lead roles, and not only co-lead or secondary roles. Same goes for females being in the lead of a research in movies. This will represent that women are just as capable to be leaders and to make decisions. In this research, 50% of the female STEM characters were represented as members of a research team. Movie production companies should include more females as part of research teams to put emphasis on the benefits of inclusive teams. Females should not only hold the title of being a scientist but should also be seen busy working in their respective field on screen. Movie companies should also explore a wider range of STEM fields and include females in more various scientific fields in movies. This will help to expose the audience to the broad opportunities possible in STEM fields. Movies

should represent as well male as female students that major in STEM fields to inspire children to choose for a major in science.

Most of the female scientists look attractive. Female scientists should have more diverse appearances so that more girls can relate to the characters. In the movie *Big Hero 6*, it was great to see that Honey Lemon and Go Go Tomago were quite different from each other. Yet they are both portrayed as intelligent, brave, and independent. Including such different, yet both strong female characters working in STEM in one movie can teach girls that it does not matter what you look like to work in these fields. Furthermore, it remains important that none of the female characters should be objectified or hypersexualized in any way. The tendency to focus on attractiveness should shift to professional abilities to set positive role models for girls.

Most female STEM characters were not shown to be in romantic relationships. It is important to portray female scientists in diverse romantic statuses in movies. Providing more realistic representation of female scientists will help to break the stereotype that scientists do not have fulfilling personal lives. Another point of attention is that the romantic narrative of a movie should not distract from female's capabilities and intelligence. It is also important to include female scientist that combine parenthood with their career in STEM.

One of the findings of this research was that compliments given to female characters were aimed at their skills rather than their looks. Movie companies should continue this trend to ensure that female scientists get the acknowledgment for their intelligence and contribution to their respective fields.

Implementing these suggestions will improve the representation of female scientists, and thus inspire young audiences, and especially girls, to pursue a career in one of the STEM fields.

### **Limitations and suggestions for further research**

A limitation of this research is that movies from just one children's movie production company are analyzed. Another limitation is that the research focuses on just movies. It would also be interesting to analyze how these characters are portrayed in other types of media such as books, websites, magazines, etc. Even though there are limitations, which is the case for every study, the findings are informative.

A suggestion for further research is to include ethnicity in the research to get more insights on diversity among female STEM workers. Furthermore, it could also be interesting to do empirical research to find out how people feel about the portrayal of female scientists in Disney movies and how these gender stereotypes influence them. It could also be interesting to do an analysis on gender stereotypes in movies that center around more other male-dominated jobs such as firefighting, racing, military, law enforcement, etc.

## References

- Ahmed, S., & Wahab, J. A. (2014). Animation and Socialization Process: Gender Role Portrayal on Cartoon Network. *Asian Social Science*, *10*(3). <https://doi.org/10.5539/ass.v10n3p44>
- Änggård, E. (2005). Barbie princesses and dinosaur dragons: narration as a way of doing gender. *Gender and Education*, *17*(5), 539–553. <https://doi.org/10.1080/09540250500192777>
- Auster, C. J., & Mansbach, C. S. (2012). The Gender Marketing of Toys: An Analysis of Color and Type of Toy on the Disney Store Website. *Sex Roles*, *67*(7–8), 375–388. <https://doi.org/10.1007/s11199-012-0177-8>
- Azmi, N., Rashid, R. A., Rahman, M. A., & Basirah, Z. S. (2016). Gender and Speech in a Disney Princess Movie. *International Journal of Applied Linguistics and English Literature*. <https://doi.org/10.7575/aiac.ijalel.v.5n.6p.235>
- Babbie, E. (2020). *The Practice of Social Research* (14th edition). Cengage Learning, Inc.
- Baker, K., & Raney, A. A. (2007). Equally Super?: Gender-Role Stereotyping of Superheroes in Children’s Animated Programs. *Mass Communication and Society*, *10*(1), 25–41. <https://doi.org/10.1080/15205430709337003>
- Baxter, J. (2020). Content Analysis. *International Encyclopedia of Human Geography*, 391–396. <https://doi.org/10.1016/b978-0-08-102295-5.10805-4>
- Bazzini, D., Curtin, L., Joslin, S., Regan, S., & Martz, D. (2010). Do Animated Disney Characters Portray and Promote the Beauty–Goodness Stereotype? *Journal of Applied Social Psychology*, *40*(10), 2687–2709.

- Bishu, S. G., & Alkadry, M. G. (2017). A Systematic Review of the Gender Pay Gap and Factors That Predict It. *Administration & Society*, 49(1), 65–104.  
<https://doi.org/10.1177/0095399716636928>
- Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6(1), 97–113. <https://doi.org/10.1177/1468794106058877>
- Cheryan, S., Plaut, V. C., Handron, C., & Hudson, L. (2013). The stereotypical computer scientist: gendered media representations as a barrier to inclusion for women. *Sex Roles*. 69, 58-71
- Churchill, S. A., Nuhu, A. S., & Lopez, K. (2019). Persistence of gender inequality: the role of ethnic divisions. *Applied Economics*, 51(8), 781–796.  
<https://doi.org/10.1080/00036846.2018.1513635>
- Davis, A. M. (2005). The ‘Dark Prince’ and dream women: Walt Disney and mid-twentieth century American feminism. *Historical Journal of Film, Radio and Television*, 25(2), 213-230.  
 doi:10.1080/0143968050013798
- Dhami, A. (2021). The Capitalization of Diversity within the Film Industry. *Sociology Mind*, 11(03), 105–123. <https://doi.org/10.4236/sm.2021.113009>
- Dicke, A. L., Safavian, N., & Eccles, J. S. (2019). Traditional Gender Role Beliefs and Career Attainment in STEM: A Gendered Story? *Frontiers in Psychology*, 10.  
<https://doi.org/10.3389/fpsyg.2019.01053>
- Diekman, A. and Murnen, S. (2004), “Learning to be little women and little men: the inequitable gender equality of nonsexist children’s literature”, *Sex Roles*, Vol. 50 Nos 5/6, pp. 373-385.

Disney (2023, 15 February). Technologists Across The Walt Disney Company Celebrate International Day of Women and Girls in Science. Life at Disney.

<https://sites.disney.com/lifeatdisney/culture-and-values/2023/02/15/technologists-across-the-walt-disney-company-celebrate-international-day-of-women-and-girls-in-science/>

*Disney Women in STEM — The PhD Princess*. (2020, 14 oktober). The PhD Princess.

<https://phdprincess.com/blog/disney-women-in-stem>

Donald, A., Koolwal, G., Annan, J., Falb, K. & Goldstein, M. (2020). Measuring Women's Agency. *Feminist Economics*, 26(3), 200–226. <https://doi.org/10.1080/13545701.2019.1683757>

Dubois-Shaik, F., & Fusulier, B. (2017). Understanding gender inequality and the role of the work/family interface in contemporary academia: An introduction. *European Educational Research Journal*, 16(2–3), 99–105. <https://doi.org/10.1177/1474904117701143>

Eagly, A. H. & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109(3), 573–598. <https://doi.org/10.1037/0033-295x.109.3.573>

England, D. E., Descartes, L., & Collier-Meek, M. A. (2011). Gender Role Portrayal and the Disney Princesses. *Sex Roles*, 64(7–8), 555–567. <https://doi.org/10.1007/s11199-011-9930-7>

Fought, C., & Eisenhauer, K. (2022). *Language and Gender in Children's Animated Films: Exploring Disney and Pixar*. Cambridge University Press.

Harriger, J. A., Wick, M. R., Trivedi, H., & Callahan, K. E. (2021). Strong Hero or Violent Playboy? Portrayals of Masculinity in Children's Animated Movies. *Sex Roles*, 85(11–12), 677–687. <https://doi.org/10.1007/s11199-021-01247-0>

Hebl, M. R., & Avery, D. R. (2013). Diversity in Organizations. In *Handbook of Psychology, Second Edition* (Vol. 12, pp. 677–692). John Wiley & Sons, Inc. <https://doi.org/10.1002/9781118133880.hop212025>

- Heilman, M. E. (2012). Gender stereotypes and workplace bias. *Research in Organizational Behavior*, 32, 113–135. <https://doi.org/10.1016/j.riob.2012.11.003>
- Hine, B. A., England, D. E., Lopreore, K. M., Horgan, E. M. A., & Hartwell, L. (2018). The Rise of the Androgynous Princess: Examining Representations of Gender in Prince and Princess Characters of Disney Movies Released 2009–2016. *Social sciences*, 7(12), 245. <https://doi.org/10.3390/socsci7120245>
- IMDb: Ratings, Reviews, and Where to Watch the Best Movies & TV Shows*. (z.d.). IMDb. <https://www.imdb.com/>
- Indhumathi, R. (2022). The Influence of Sex Role Perception on Career Aspirations and Self-Esteem in Children with a Preference for Disney Movies. *International Journal of Indian Psychology*, 7(1). <https://doi.org/10.25215/0701.020>
- Jean, V. A., Payne, S. C., & Thompson, R. J. (2014). Women in STEM: Family-Related Challenges and Initiatives. *Gender and the Work-Family Experience*, 291–311. [https://doi.org/10.1007/978-3-319-08891-4\\_15](https://doi.org/10.1007/978-3-319-08891-4_15)
- Jiang, X. (2021). Women in STEM: Ability, preference, and value. *Labour Economics*, 70, 101991. <https://doi.org/10.1016/j.labeco.2021.101991>
- Kaplan, E. B., Davis, S. K., Woo, H., & Withers, E. (2020). Special Issue on *Millennials/Gen Zs: Engaging, Researching and Teaching about Power, Diversity and Change*. *Sociological Perspectives*, 63(3), 406–407. <https://doi.org/10.1177/0731121420919575>
- Kerkhoven, A. H., Russo, P., Land-Zandstra, A. M., Saxena, A., & Rodenburg, F. (2016). Gender Stereotypes in Science Education Resources: A Visual Content Analysis. *PLOS ONE*, 11(11), e0165037. <https://doi.org/10.1371/journal.pone.0165037>

- Leaper, C., Breed, L. M., Hoffman, L., & Perlman, C. A. (2002). Variations in the Gender-Stereotyped Content of Children's Television Cartoons Across Genres. *Journal of Applied Social Psychology, 32*(8), 1653–1662. <https://doi.org/10.1111/j.1559-1816.2002.tb02767.x>
- Lin, C. A. (2001). The VCR, home video culture, and new video technologies. In J. Bryant & J. A. Bryant (Eds.), *Television and the American family* (2nd ed.) (pp.91-107). Mahwah, B. NJ: Lawrence Erlbaum.
- Maclaran, P. (2015). Feminism's fourth wave: a research agenda for marketing and consumer research. *Journal of Marketing Management, 31*(15–16), 1732–1738. <https://doi.org/10.1080/0267257x.2015.1076497>
- Martin, C. L., Ruble, D. N., & Szkrybalo, J. (2002). Cognitive theories of early gender development. *Psychological Bulletin, 128*(6), 903–933. <https://doi.org/10.1037/0033-2909.128.6.903>
- Mohajan, H. K. (2022). Four Waves of Feminism: A Blessing for Global Humanity. *Studies in Social Science & Humanities, 1*(2). <https://doi.org/10.56397/sssh.2022.09.01>
- Patterson, G. R., & Spencer, L. G. (2017). What's so funny about a snowman in a tiara? Exploring gender identity and gender nonconformity in children's animated films. *Queer studies in media & popular culture, 2*(1), 73–93. [https://doi.org/10.1386/qsmc.2.1.73\\_1](https://doi.org/10.1386/qsmc.2.1.73_1)
- Research Methods: Information, Systems, and Contexts* (2de editie). (2017). Van Haren Publishing.
- Rosen, S. (1981). The Economics of Superstars. *The American Economic Review, 845-958*. <https://doi.org/10.2307/j.ctv1kz4h99.12>
- Sassler, S., Glass, J., Levitte, Y., & Michelmore, K. M. (2017). The missing women in STEM? Assessing gender differentials in the factors associated with transition to first jobs. *Social Science Research, 63*, 192–208. <https://doi.org/10.1016/j.ssresearch.2016.09.014>

- Schiele, K., Louie, L., & Chen, S. T. (2020). Marketing feminism in youth media: A study of Disney and Pixar animation. *Business Horizons*, 63(5), 659–669.  
<https://doi.org/10.1016/j.bushor.2020.05.001>
- Shawcroft, J., Coyne, S. M., Zurcher, J. D., & Brubaker, P. J. (2022). Depictions of Gender Across Eight Decades of Disney Animated Film: The Role of Film Producer, Director, and Writer Gender. *Sex Roles*, 86(5–6), 346–365. <https://doi.org/10.1007/s11199-022-01273-6>
- Signorielli N. 2012. Gender stereotyping on television. In *Media Psychology*, ed. G Brewer, pp. 170–86. New York: Palgrave Macmillan
- Silva, M., & Klasen, S. (2021). Gender inequality as a barrier to economic growth: a review of the theoretical literature. *Review of Economics of the Household*, 19(3), 581–614.  
<https://doi.org/10.1007/s11150-020-09535-6>
- Sink A, Mastro D. 2017. Depictions of gender on primetime television: a quantitative content analysis. *Mass Commun. Soc.* 20:3–22
- Smith, S. L., Pieper, K., & Khan, A. (2022). Inclusion in the Director’s Chair: Analysis of Director Gender & Race/Ethnicity Across 1,500 Top Films from 2007 to 2021. In *USC Annenberg inclusion initiative*. USC Annenberg inclusion initiative.  
<https://assets.uscannenberg.org/docs/aii-inclusion-directors-chair-2022.pdf>
- Standing, H. (2022). *Dependence and Autonomy (Routledge Library Editions: Women and Work)* (1ste editie). Routledge.
- Steinke, J., Applegate, B., Lapinski, M. K., Ryan, L., & Long, M. (2012). Gender Differences in Adolescents’ Wishful Identification With Scientist Characters on Television. *Science Communication*, 34(2), 163–199. <https://doi.org/10.1177/1075547011410250>



- Steinke, J., & Paniagua Tavaréz, P. M. (2018). Cultural Representations of Gender and STEM: Portrayals of Female STEM Characters in Popular Films 2002-2014. *International Journal of Gender, Science and Technology*, 9(3), 244–277. Retrieved from <https://genderandset.open.ac.uk/index.php/genderandset/article/view/514>
- Steyer, I. (2014). Gender representations in children's media and their influence. *Campus-Wide Information Systems*, 31(2/3), 171–180. <https://doi.org/10.1108/cwis-11-2013-0065>
- Suga, M., Blazhevskaya, V., Blazhevskaya, V., Chen, Y., & Chen, Y. (2022, 7 november). *United Nations: Gender equality and women's empowerment*. United Nations Sustainable Development. <https://www.un.org/sustainabledevelopment/gender-equality/>
- Tan, A., Jocz, J., & Zhai, J. (2015) Spiderman and science: How students' perceptions of scientists are shaped by popular media. *Public Understanding of Science*, 1-11 November 18, 2015, doi: 10.1177/0963662515615086.
- Tannen, D. (1992). You just don't understand : women and men in conversation. *Philosophy and Rhetoric*, 26(1). <https://www.drdouggreen.com/wp-content/You-Understand2.pdf>
- The Walt Disney Company 2019. Diversity and Inclusion Commitment. <https://thewaltdisneycompany.com/app/uploads/2019/09/DiversityAndInclusionCommitment.pdf>
- Thompson, T. L., & Zerbinos, E. (1995). Gender roles in animated cartoons: Has the picture changed in 20 years? *Sex Roles*, 32(9–10), 651–673. <https://doi.org/10.1007/bf01544217>
- Ward, L. M., & Grower, P. (2020). Media and the Development of Gender Role Stereotypes. *Annual review of developmental psychology*, 2(1), 177–199. <https://doi.org/10.1146/annurev-devpsych-051120-010630>
- Wasko, J. (2020). *Understanding Disney: The manufacture of fantasy* (2nd ed.). Polity Press

Watts, M. J. (2005). On the Conceptualisation and Measurement of Horizontal and Vertical Occupational Gender Segregation. *European Sociological Review*, 21(5), 481–488.  
<https://doi.org/10.1093/esr/jci034>

Wong, Y. T., & Charles, M. (2020). Gender and Occupational Segregation. *Companion to Women's and Gender Studies*, 303–325. <https://doi.org/10.1002/9781119315063.ch16>

Wynns, Scarlet L. and Rosenfeld, Lawrence B.(2003) 'Father-daughter relationships in Disney's animated films', *Southern Communication Journal*, 68: 2, 91 — 106

Zsubori, A. (2022). Recasting the Disney Princess in an Era of New Media and Social Movements. *Feminist Media Studies*, 22(4), 1004–1006. <https://doi.org/10.1080/14680777.2022.2104905>

## **Appendix I: Definition of STEM character and selection criteria**

*“A STEM (science, technology, engineering, mathematics) character is defined here as a general scientist, specific kind of scientist (marine biologist, chemist, astronaut), engineer, technology professional, computer scientist/programmer, mathematician, and anyone using scientific equipment or computers in a work/research setting*

*The STEM character must meet one or more of the following criteria:*

- 1. Character is listed as scientist or STEM professional in cast lists on IMDb or Wikipedia*
- 2. Character is mentioned by other characters in the film as a scientist or STEM professional*
- 3. Character describes him/herself or self-identifies as a scientist or STEM professional in the film*
- 4. Character is shown in a white lab coat or other professional attire that indicates affiliation with science and/or technology*
- 5. Character is shown working as a scientist or STEM professional (doing science experiments, programming or operating computers, mixing chemicals, gathering scientific samples) in a STEM workplace such as a scientific laboratory, computer station, space station or spaceship, or scientific research field-work station (archaeology dig site, geology site, oceanography lab on beach or boat)”*

*Source: (Steinke & Tavarez, 2018, p.267).*

## Appendix II: Codebook

### Male and Female STEM Characters in Speaking Roles

Gender	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Male					
Female					
Total					

*Male and Female STEM Characters in Speaking Roles, Source: (Steinke & Tavarez, 2018)*

### Female STEM Characters by Movie Role

Role	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Lead					
Co-lead					
Secondary					
Total					

*Female STEM Characters by Movie Role, Source: (Steinke & Tavarez, 2018)*

### Female STEM Characters by STEM field

STEM field	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Engineering					
Computer Science					
Biology					
Chemistry					
Astronomy					
Mathematics					
Physics					
Psychology					
Robotics/ Technology					
Anthropology					
Geology					
Archeology					
Total					

*Female STEM Characters by STEM field, Source: (Steinke & Tavarez, 2018)*

### Female STEM Characters by Professional Status

Professional Status	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
Lead Researcher					

<b>Member of Research Team</b>					
<b>Research Assistant</b>					
<b>Student</b>					
<b>Other</b>					
<b>Total</b>					

*Female STEM Characters by Professional Status, Source: (Steinke & Tavarez, 2018)*

### **Female STEM Characters by Characterization**

Characterization	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Professional</b>					
<b>Mad/maniacal</b>					
<b>Clumsy /absentminded</b>					
<b>Nerdy/geeky</b>					
<b>Loner, antisocial, socially awkward</b>					
<b>Total</b>					

*Female STEM Characters by Characterization, Source: (Steinke & Tavarez, 2018)*

### **Female STEM Characters by Appearance**

Appearance	Big Hero 6	WALL-E	Atlantis: The lost city	Tarzan	Total
<b>Attractive</b>					
<b>Glamorous/Sexy</b>					
<b>Unattractive/geeky /nerdy</b>					
<b>Total</b>					

*Female STEM Characters by Appearance, Source: (Steinke & Tavarez, 2018)*

### **Female STEM Characters by Hypersexualization**

Hypersexualization	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Sexualized attire or partially naked</b>					
<b>Regular/modest attire</b>					
<b>Total</b>					

*Female STEM Characters by Hypersexualization, Source: (Steinke & Tavarez, 2018)*

### Female STEM Characters by Romantic Status

Romantic Interest	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Married</b>					
<b>In a relationship</b>					
<b>Considering relationship</b>					
<b>Focus of romantic interest/Not reciprocated</b>					
<b>Not in a relationship</b>					
<b>Cannot determine</b>					
<b>Total</b>					

*Female STEM Characters by Romantic Status, Source: (Steinke & Tavarez, 2018)*

### Female STEM Characters by Parental Role

Parental Role	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Parent/guardian</b>					
<b>Former parent/guardian</b>					
<b>No children</b>					
<b>Total</b>					

*Female STEM Characters by Parental Role, Source: (Steinke & Tavarez, 2018)*

### Masculine stereotypical characteristics

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Physically Strong</b>					
<b>Assertive</b>					
<b>Athletic</b>					
<b>Brave</b>					
<b>Independent</b>					
<b>Intellectual</b>					
<b>Total</b>					

*Coding scheme masculine stereotypical characteristics (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002))*

### Feminine stereotypical characteristics

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Physically weak</b>					
<b>Affectionate</b>					
<b>Sensitive</b>					
<b>Submissive</b>					
<b>Nurturing</b>					
<b>Dependent</b>					
<b>Total</b>					

*Coding scheme feminine stereotypical characteristics (based on research from Ahmed & Wahab (2014), Baker & Raney (2007), England et al. (2011), and Leaper et al. (2002))*

### Number of times complimented on looks vs on skills

	Big Hero 6	WALL-E	Atlantis: The lost empire	Tarzan	Total
<b>Number of times complimented on looks</b>					
<b>Number of times complimented on skills</b>					
<b>Total</b>					

*Number of times complimented on looks vs numbers of times complimented on skills*