

## MASTER

### The survivorship of older women in software development an intersection between age and gender

van Breukelen, Sterre G.R.

*Award date:*  
2022

[Link to publication](#)

#### **Disclaimer**

This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

#### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain



Department of Mathematics and Computer Science  
Software Engineering and Technology Group

# The survivorship of older women in software development: an intersection between age and gender

*Master Thesis*

S.G.R van Breukelen

Supervisors:

Prof. dr. A. Serebrenik

Dr. rer. nat. S. Baltes

Dr. A. Barcomb

Committee:

Prof. dr. A. Serebrenik

Dr. E. Constantinou

Prof. dr. G.H.L. Fletcher

Version 1.0

Eindhoven, May 2022

# Abstract

The software industry is often considered to be for young men. However, women are also a part of the industry, and so are older people. However, their experience is often overlooked by those around them. While research has looked into ageism within software engineering and sexism within software engineers, little research has been done about the combination. In this research, we will look at several age and gender related matters within the industry, specifically, how older women survive and their experiences. We can use these experiences and strategies to learn why women stay and how they manage the negative aspects of the industry. We interviewed 14 older women in software development who shared their strategies and experiences. Several strategies have been found that might contribute to how women have stayed in the industry, such as side projects and networking. Moreover, several experiences, both positive and negative, based on age and gender have been found, such as not being taken seriously, and more opportunities.

# Preface

I would like to thank Dr. Alexander Serebrenik, Dr rer.-nat. Sebastian Baltes and Dr. Ann Barcomb for supervising this research. Their input and understanding were important for the success of this project. Additionally, their support during challenging times helped me stay on track. Additionally, I would like to thank Dr. Eleni Constantinou and Dr. George Fletcher for taking the time to be members of my graduation committee and for being understanding when circumstances changed. Most of all, I would like to thank the people who participated in this research. Without their participation, I would not have been able to finish this work and gain the insights I did. Lastly, I would like to thank my friends and family for supporting me throughout my study and my thesis. A special thanks to Andrei, who kept me sane when the stress was mounting and who I was always there to talk to.

Sterre van Breukelen Eindhoven, May 2022

# Contents

<b>Contents</b>	<b>iv</b>
<b>List of Figures</b>	<b>vi</b>
<b>List of Tables</b>	<b>vii</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Literature review</b>	<b>3</b>
2.1 Aging in Tech . . . . .	3
2.1.1 Age Stereotypes and discrimination . . . . .	3
2.1.2 Effects of Stereotype and discrimination . . . . .	4
2.1.3 Validity of the Stereotypes . . . . .	5
2.1.4 Intervention for the Stereotypes . . . . .	5
2.2 Gender in Software engineering . . . . .	6
2.2.1 Gender Stereotypes and discrimination . . . . .	6
2.2.2 Effect of the stereotypes and discrimination . . . . .	7
2.2.3 Validity of stereotypes . . . . .	7
2.3 The intersection of age and gender in the workplace . . . . .	7
<b>3 Methodology</b>	<b>9</b>
3.1 Demographic . . . . .	9
3.2 Invite procedure . . . . .	9
3.3 Interview . . . . .	12
3.3.1 Demographic . . . . .	12
3.3.2 View of the industry . . . . .	12
3.3.3 View of the industry (age & gender) . . . . .	12
3.3.4 Feeling under-valued . . . . .	12
3.3.5 Feeling like leaving the field . . . . .	13
3.3.6 Gender and age-specific strategies . . . . .	13
3.3.7 Existing literature . . . . .	13
3.4 Processing the interviews . . . . .	13
<b>4 Results</b>	<b>16</b>
4.1 Saturation . . . . .	16
4.2 Demographic information . . . . .	18
4.3 Code book . . . . .	21
4.3.1 RQ1: What strategies have women adopted that they perceive as contributing to their survival in software engineering? . . . . .	22
4.3.2 RQ2: What are of the experiences relating to gender and age have women in software engineering encountered? . . . . .	45
4.3.3 RQ3: How have women with prolonged careers experienced feeling valued? . . . . .	59

4.3.4	RQ4: How have women felt about leaving the industry throughout their career? . . . . .	62
4.3.5	RQ5: How have women with prolonged careers experienced task assignment? . . . . .	65
<b>5</b>	<b>Discussion . . . . .</b>	<b>68</b>
5.1	Visibility . . . . .	68
5.2	Changing appearance . . . . .	69
5.3	Valued and Undervalued . . . . .	70
5.4	Leaving . . . . .	70
<b>6</b>	<b>Threads to Validity . . . . .</b>	<b>71</b>
6.1	Construct validity . . . . .	71
6.2	Internal Validity . . . . .	71
6.3	External Validity . . . . .	71
6.4	Conclusion Validity . . . . .	71
<b>7</b>	<b>Conclusions . . . . .</b>	<b>73</b>
7.1	Future work . . . . .	73
	<b>Bibliography . . . . .</b>	<b>75</b>
	<b>Appendix . . . . .</b>	<b>81</b>
<b>A</b>	<b>Recruitment message Screening Survey - Experience of older women and non-binary people in software development . . . . .</b>	<b>81</b>
<b>B</b>	<b>Consent form . . . . .</b>	<b>83</b>
<b>C</b>	<b>Interview script . . . . .</b>	<b>90</b>
<b>D</b>	<b>Code for preprocessing the interviews . . . . .</b>	<b>92</b>
<b>E</b>	<b>Codebook . . . . .</b>	<b>93</b>

# List of Figures

3.1	The process of inviting a participant . . . . .	10
3.2	Examples of Tweets used to find participants. . . . .	10
3.3	The contact message that was sent to possible participants . . . . .	11
3.4	Saturation Metric . . . . .	14
4.1	Number of new codes for all codes . . . . .	17
4.2	Age distributions . . . . .	18
4.3	Distribution of years of experience . . . . .	18
4.4	Gender distribution . . . . .	19
4.5	Distribution of working in software development . . . . .	19
4.6	Career switches . . . . .	20
4.7	Industries the participants worked in . . . . .	20
4.8	All codes including the number of code segments . . . . .	21
4.9	All codes in Age and/or gender related strategies . . . . .	22
4.10	All codes pertaining to Age related strategy . . . . .	28
4.11	All codes pertaining to Gender related strategy . . . . .	32
4.12	All codes pertaining to General strategies . . . . .	43
4.13	All codes including the Age and/or Gender based experiences . . . . .	45
4.14	All codes including the Age based experiences . . . . .	48
4.15	All codes including the Gender based experiences . . . . .	50
4.16	All codes including the General experiences . . . . .	54
4.17	All codes including the Pregnancy/parenthood related experience . . . . .	57
4.18	All codes related to value . . . . .	60
4.19	All codes related to Feeling towards leaving . . . . .	62
4.20	All codes related to Task assignment . . . . .	66

# List of Tables

4.1	Changes made in the last 8 interviews for all codes . . . . .	16
4.2	Saturation calculations for all codes . . . . .	16
4.3	Changes made in the last 8 interviews for all codes related to strategies . . . . .	17
4.4	Saturation calculations for all codes related to strategy . . . . .	17
4.5	The strategies that are contained within the Against Bias subcategory . . . . .	23
4.6	The strategies that are contained within the Career related subcategory in age and gender related strategies . . . . .	24
4.7	The strategies that are contained within the Side projects . . . . .	25
4.8	The Age and/or gender Strategies that are contained within the chancing work environment . . . . .	26
4.9	The strategies that are contained within the Career related subcategory in Age related strategies . . . . .	28
4.10	The strategies that are contained within the Behaving younger in Age related strategies . . . . .	29
4.11	The strategies in Changing appearance in Age related strategies . . . . .	30
4.12	The Age strategies that are contained within the Changing work environment . . . . .	31
4.13	Age related strategies without subgroup . . . . .	32
4.14	Gender related strategies in Against gender bias strategy . . . . .	33
4.15	Communication methods in gender strategies . . . . .	34
4.16	Career related strategies in Gender related strategies . . . . .	35
4.17	Ignoring situations in Gender related strategies . . . . .	37
4.18	Changing work environment in Gender related strategies . . . . .	38
4.19	Traditionally Feminine in Gender related strategies . . . . .	39
4.20	Traditionally Masculine in Gender related strategies . . . . .	39
4.21	Changing appearance in Gender related strategies . . . . .	41
4.22	Strategies without subgroups in Gender related strategies . . . . .	43
4.23	General strategies . . . . .	44
4.24	Positive experiences in Age and/or Gender based experiences . . . . .	46
4.25	Negative experiences in Age and/or Gender based experiences . . . . .	47
4.26	Positive experiences in Age based experiences . . . . .	48
4.27	Negative experiences in Age based experiences . . . . .	49
4.28	Positive experiences relating to the Industry in Gender based experiences . . . . .	50
4.29	Positive experiences relating to the work in Gender based experiences . . . . .	51
4.30	Negative experiences in Gender based experiences . . . . .	51
4.31	Negative experiences relating to Sexism in Gender based experiences . . . . .	52
4.32	One of the codes in negative experiences in general experience . . . . .	54
4.33	Related to the type of work in positive experiences of general experiences . . . . .	55
4.34	Related to their job/company in Positive experiences of General experiences . . . . .	55
4.35	Related to the Industry in Positive experiences of General experiences . . . . .	56
4.36	Negative experiences of General experiences . . . . .	56
4.37	Negative experiences related to the Industry in General experiences . . . . .	56
4.38	Negative experiences related to the job/company in General experiences . . . . .	57



## LIST OF TABLES

---

4.39	Positive experiences related to pregnancy and parenthood . . . . .	58
4.40	Negative pregnant or Parenthood experiences . . . . .	58
4.41	Distribution of code segments and number of people for Feeling valued . . . . .	60
4.42	Codes related to Well valued . . . . .	60
4.43	Codes related to Undervalued/not valued . . . . .	61
4.44	Codes details related to Feeling of leaving . . . . .	62
4.45	Considered leaving due to Age based experiences . . . . .	63
4.46	Considered leaving due to Gender based experiences . . . . .	64
4.47	Considered leaving due to Industry based experiences . . . . .	64
4.48	Not considered leaving . . . . .	65
4.49	Code distribution of task assignment . . . . .	65
4.50	Task assignment done differently . . . . .	66

# Chapter 1

## Introduction

“The software industry is designed for young men with few family attachments, and if you don’t fit in that box it can be rough.” One of the participants in this study said this, and this belief is at the core of this research. However, there are people in the industry who are neither men nor young that can have a different experience, which should not be overlooked. We will be looking at the intersection between age and gender, which is scarcely researched within social software engineering. When it is, the research is often a small part of the research [1–7]. Thus, this research will add to the existing literature and possibly shed light upon issues pertaining to age and gender.

Why is it a problem, and why is there a need for this study. Many women leave the industry. Research states that 50% of women leave the tech industry throughout their career [8], which could possibly be prevented. Retaining more women in the industry would be beneficial for women in the field, for companies and the industry as a whole, and for society.

It could benefit women because the women who remain within the industry have experiences and knowledge on how to manage certain situations, which can benefit future generations. Women currently entering the industry or who are already a part of the industry might learn what other women have done to maintain a long career in the software industry, leading to retaining more women. It is important to mention that we do not advocate for individual change over systematic change. However, we could provide women with tools to help survive the industry currently while system change happens.

It can benefit the companies and the industry because when people leave an industry, knowledge is lost, regardless of gender. However, when an industry loses many people of a specific group, their particular knowledge is lost. Firstly, the women’s lived experience is different from men’s; thus, their perspective could bring unique views [9]. Additionally, research shows that gender diversity in R&D teams leads to radical innovations [10], and different point of view, educational backgrounds, and experiences also leads to innovation [11]. Thus losing women would mean less innovation, as losing women would mean losing different points of view and experiences. Therefore it is important to retain women.

The loss of knowledge is not the only negative; the loss of diversity is another negative aspect. Several studies have observed positive aspects of diversity in a software development team [10,12–15]. It has been observed that gender and tenure diversity in teams lead to more productivity [12]. Additionally, gender diversity is good against community smells, which are patterns in code that indicate suboptimal communication and organization by the software development teams that can cause unanticipated project costs [13]. Moreover, most employees in the IT sector find gender diverse teams to have a more pleasant atmosphere [14]. Thus research has found several positives to having diversity which indicates that losing this diversity can be a negative.

Lastly, retaining women could benefit society because the loss of women can also affect future gender diversity. Girls do not recognize themselves in what they perceive a computer scientist is, which is why they do not consider ICT as a career choice [16,17]. A method to change this perception is by the representation of women in computer science, which is shown by the research that women role models increase interest in tech-related studies [18,19]. Thus, retaining women

within the field is important to increase gender diversity within software development for the following generations.

All these reasons show why retaining women in the industry is important and thus, finding out what women do to remain in the industry is beneficial. Thus the main research question that this study will try to answer is:

**What strategies have women adopted that they perceive as contributing to their survival in software engineering?**

In addition to the main research question, several secondary questions are raised such that we can gain more insight relating to their experience, specifically regarding age and gender.

- **What are of the experiences relating to gender and age have women in software engineering encountered?**

While there is a lot of literature regarding women and their experiences in software engineering (see Chapter 3: Literature review), this literature focuses mostly on just gender. In this research, we will focus on experiences regarding age and gender and how experiences might change throughout their career, which to the author's knowledge, has not been studied.

- **How have women with prolonged careers experienced feeling valued?**

This question was added to get more insight into how women feel valued throughout their careers and if they feel valued. Additionally, it could give insight into how women deal with feeling undervalued.

- **How have women felt about leaving the industry throughout their career?**

This question was added to gain insight into; if women feel like leaving the industry, how they deal with these feelings, and if the feelings change through their career.

- **How have women with prolonged careers experienced task assignment?** This question adds to the literature about gendered task allocation and adds age to the task allocation. We also look if there are changes throughout their career and how women deal with them.

# Chapter 2

## Literature review

In this chapter, we will discuss the literature regarding; aging in tech, gender in software engineering, and the intersection of gender and age in the workforce.

### 2.1 Aging in Tech

Age in software engineering is a topic that still is fairly unexplored. In a recent systematic literature review performed by Rodríguez-Pérez, Nadri and Nagappan published in 2021. They found that 8% of the 131 papers that focus on age diversity in software engineering [20]. This result clearly shows the lack of studies about age in software engineering, and thus, looking beyond software engineering is necessary to create a complete picture. Research into related industries can reveal more about what also occurs in software engineering.

We will discuss the stereotypes and discrimination related to age. The effects of these stereotypes and discrimination. The validity of them and interventions. At the core of many issues relating to age are stereotypes and discrimination.

#### 2.1.1 Age Stereotypes and discrimination

Age stereotypes are widespread in technical fields [21–26]. Posthuma and Campion (2009) identified six stereotypes that older workers face in a workplace [27].

- **Poor Performance Stereotype:**  
This stereotype states that older workers are less productive, less motivated, and less skilled compared to younger workers.
- **Resistance to Change Stereotype**  
The stereotype says that it is harder to train older adults, as well as that they are less flexible and more resistant to change. This would reduce training investment.
- **Lower Ability to Learn Stereotype**  
This stereotype states that older adults have less ability to learn and thus less potential to improve.
- **Shorter Tenure Stereotype**  
This stereotype means that older workers have shorter job tenure and thus less time to return the training investment through work.
- **More Costly Stereotype**  
The stereotype is that older adults are more costly due to: higher wages and greater use of benefits.

- More Dependable Stereotype

This stereotype means that older adults are more dependable, stable, honest, loyal, and committed, as well as that they are less likely to miss work or have a quick turnover.

Not all the stereotypes that have been identified were negative. The stereotype that older workers are more dependable is a positive stereotype.

While these stereotypes were seen in workplaces in general and not specifically in software engineering or technical industry, the study does mention that these stereotypes are more prevalent in information technology/computing [27].

The Poor Performance Stereotype was also found in the Agile Software Development (ASD) [21] and in different cultures. Schloegel, Stegmann, Maedche and van Dick (2018) researched stereotypes in Agile Software Development (ASD) [21]. They conducted a quantitative survey among 464 employees of two software development companies to discover the age stereotypes in ASD. They found similar results as Posthuma and Campion. They discovered that older employees face Poor Performance Stereotypes than middle-aged employees. However, younger employees also face Poor Performance Stereotypes compared to middle-aged employees. Interestingly, they found that the stereotypes are stronger for older developers than older employees with a non-developer role in ASD. Overall, negative stereotypes against older developers are most pronounced, and the younger the developer, the stronger the bias against older developers is. Additionally, Schloegel, Stegmann, van Dick and Maedche (2018) found that the strength of the stereotypes towards older developers is different in different cultures; China and Eastern Europe hold stronger negative stereotypes compared to Germany [22]. However, they still found that middle-aged developers have higher performance expectations than younger and older developers across all cultures.

Another stereotype found within computer [28] and information technology [29] is the stereotypes is Lower Ability to Learn [28, 29]. Xia and Kleiner (2001) found that the computer industry was youth-orientated and that the stereotype that older workers are slow, unwilling to, or incapable of learning new skills was perpetuated.

Another stereotype discussed is that older workers are more costly than younger workers within technology work [29]. This is not just due to wages, but younger workers are cheaper in regards to benefits. Additionally, they added that older workers are at times seen as unwilling to work long hours, which is linked to older workers having more obligations such as family, mortgages, and dependants [29]. These findings were held by company executives, HR managers, but also employees themselves.

Older adults also have age stereotypes towards themselves, which was found by Comeau and Kemp (2007) [25] and Davidson et al. (2014a) [30]. Comeau and Kemp (2007) found that developers associated with learning to youth, which falls under the Lower Ability to Learn Stereotype. Older age was also linked to becoming “low, awkward and ill-suited” in the field [25]. These opinions could be considered a Poor Performance Stereotype. Additionally, Comeau and Kemp (2007) found a negative stereotype linked to the desire to stay a developer, which was connected to a lack of drive [25]. This negative stereotype could be related to the stereotype that states that older workers are reluctant to change.

Davidson et al. (2014b) interviewed older adults a part of the Free/Open Source Software (FOSS) community, noting some stereotypes. Interestingly, all of the eleven interviewees mentioned they did not witness or experience any ageism. However, four interviewees made comments or recounted events that were coded as negative age-related stereotypes towards others [23]. Davidson et al. (2014b) also coded negative age-related stereotypes toward younger people. A FOSS community leader reasoned that ageism is not witnessed in the community due to the lack of older participants. However, the authors also suggested that ageism might not be thought of as a form of discrimination compared to other types of discrimination.

### 2.1.2 Effects of Stereotype and discrimination

These stereotypes can primarily negatively affect older developers, employers, and the industry, and several studies observe this [25, 26, 28, 31].

There are some negative impacts on the companies. Age discrimination has several consequences for industry: labor shortage, legal action [28]. Legal actions are in the form of discrimination lawsuits.

There are several negative impacts that affect older workers. Older workers are also negatively affected by stereotypes [25]. For example, older workers who want to remain developers, often feel pressured to move into management because they are perceived as lacking competency. Comeau and Kemp (2007) found that stepping away from technology is requisite in a normal IT career trajectory. Additionally, it is natural for a programmer to move to a managerial role when aging [25, 26]. Another reason why programmers move away from technical roles is due to the mental labor needed to keep up with the ever-changing industry, which can be linked to the ability to learn [26]. This role change can be considered an adverse effect on the Poor Performance Stereotype as some programmers might not want to move to managerial roles but might be forced to move to non-technical roles. Additionally, experience is seen as less necessary in the industry. Instead, marketable skills and knowledge of current technology are more important [26, 28]. The focus on marketable skills also complies with early-retirement norms seen in IT [26]. Due to the youth focus industry, it might be challenging to find employment at a later age. Several employment strategies have been reported in the media to help concerning employment, as been seen in the paper by Baltes, Park, and Serebrenik (2020) [31]. Some of these strategies focus on appearing young by, for example, adjusting resumes, behaving younger, and more drastically undergoing plastic surgery. Again this shows the adverse effects age-related stereotypes can have on the employee.

Lastly, Age stereotypes affect the industry, as Age stereotypes have been shown to affect employment decisions such as interview rating and performance appraisals [28]. Older workers have more experience, and knowledge [28]. Thus when they leave the industry or their technical roles, this knowledge and experience also leave the industry. This experience is seen as the most valuable attribute an older worker has [29]. Experienced informants from Marshalls' paper state the importance of having a mixed age range in a team, as "you need someone who has gone through it" [29]. Additionally, Davidson et al. (2014b) found ten benefits for older developers, such as professional experience, life experience, software development experience, maturity, and more connections [23]. Davidson et al. (2014a-b) also found that older workers have different motivations. The top three motivations of the older participant were intrinsic motivation, community identification, and altruism, whereas younger developers are more motivated by career benefits and learning [23, 30]. Moreover, senior developers (60+) in the Stack Overflow community were found to teach more often than to learn [32].

### 2.1.3 Validity of the Stereotypes

Stereotypes are not necessarily valid. There is several literature that disproves the stereotypes [28, 33–36].

Poor Performance Stereotype can be disproven as there is little evidence that performance declines when a worker gets older [28]. Kock et al. (2018) found that older programmers with enough experience performed on the same level as younger programmers [33]. Morrison et al. (2016) analyzed StackOverflow data and found a suggestion that technology knowledge sometimes improves the knowledge of a successor technology [34]. Additionally, they suggest that older developers have a broader knowledge compared to younger ones. Moreover, a study was performed about code reviews in Japan and found that age and experience do not affect the code review efficiency nor the correctness [36].

Lower Ability to Learn Stereotype can also be disproven. In a Stack Overflow, data by Morrison and Murphy-Hill found that programming can be maintained at an older age, as well as, new knowledge and be acquired [35].

### 2.1.4 Intervention for the Stereotypes

Older workers face many negative stereotypes that can affect them in the industry. It also affects the employers and industry. Due to the negative effects of the stereotypes on older workers,

employers, and the industry, we would like to intervene. However, some interventions could reduce this.

The interventions that Schloegel, Stegmann, Maedche, and van Dick (2016) propose are in the form of diversity training, and cooperation-based diversity training [24]. Cooperation-based diversity training means that employees of different age groups collaborate on tasks. They researched two interventions that had the aim of reducing age stereotypes in software development. Several positive results came from the interventions. The intervention was shown to reduce negative age stereotypes about performance and innovation expectations significantly. As well as, reduce bias towards both younger and older developers, which can be done casually and in the long term.

## 2.2 Gender in Software engineering

Gender diversity is a more commonly studied diversity aspect compared to age. Rodríguez-Perez et al. (2021) found that 61% of the papers they viewed for their literature review regarding diversity [20].

### 2.2.1 Gender Stereotypes and discrimination

Gender stereotypes and sexism are closely related as sexism is expressed by gender stereotypes, discrimination and biases [37]. While sexism and gender stereotypes are not exclusive to software engineering, women do suffer from them in the industry [38]. This section will discuss some gender stereotypes women face within the workplace, specifically those also recognized within the industry.

- **Less competent Stereotype**  
This gender stereotype pertains to the assumption that women are technically incompetent [38–41].
- **Work is secondary Stereotype**  
This is the belief that women prioritize family over work.

The stereotype of being seen as less competent is visible within the industry [38, 40, 42, 43]. Firstly, in the research of Smith (2013), women perceive this assumption in their workplace. Smith interviewed 15 women in IT, who noted this assumption by feeling a need to prove their technical competence constantly [38, 40, 42]. Women not only feel the belief of incompetence within the industry, but women themselves also judge their computer competence lower than men [43]. Moreover, the stereotype is also noticeable in that women are assumed to have non-technical jobs such as working in HR or Marketing [40]. The bias that women put family before work is visible within the industry [44]. Moreover, Yeganehfar et al. (2018) performed a systematic literature review about the "marginal participation of women in ICT-related jobs", where different papers mentioned the issue of work-life balance [45].

Besides stereotypes, it is important to mention the sexism and discrimination women face in the industry. Sexism and discrimination can greatly affect women.

Women have to deal with sexist statements, jokes, sexual harassment, being ignored, and assumptions [42, 46, 47]. This treatment can make women feel excluded [47]. Additionally, some people believe that women do not belong in the FLOSS industry, which was mentioned by Lee and Carver (2019) [42]. While they also found that the silent majority cared about diversity and inclusion, the loud majority might chase away women [42]. Additionally, to the sexism, there is discrimination regarding promotion, positions, and pay [1, 5, 46, 48]. Sexism and discrimination have been linked to women leaving the industry [3]. However, the reason why women stay in the industry is not widely known.

### 2.2.2 Effect of the stereotypes and discrimination

Women being seen as less competent has been related to the feeling of needing to prove their ability leads to women feeling that they need to be better than men [38, 40]. Additionally, the incompetence assumption could explain why women are allocated less complex tasks. In the research of Maji and Dixit (2020), a participant mentioned being given simple tasks when they could do more complicated coding tasks [46]. The gendered task allocation was perceived by Canedo et al. (2021), who interviewed 17 women [49]. This gendered task allocation can affect career growth and could demotivate women.

The stereotype that women put careers secondary might affect women's careers. Ahuja mentioned that employers might expect women to reduce hours after childbirth and thus not promote them [44]. The lack of promotion or job opportunities because managers assumed that women are more family-oriented was seen in the interviews of Maji and Dixit (2020).

Here we see many problems related to gender that women face. However, we know very little about possible solutions women have.

### 2.2.3 Validity of stereotypes

There is research showing that women are not less competent than men. Terrell et al. (2017) observed that women's pull requests to open-source software (OSS) are more accepted than men's pull requests when they are a part of the project. However, if contributor's gender is identifiable and they are outside of the project, then men's acceptance rates are higher [50]. Thus it suggests that women are more or at least as competent as men. Thus based on this research, the stereotype does not hold.

There is some evidence that women are more family-oriented than work-oriented. Some of the women in ICT, who participated in Crump, Logan, and McIlroy's (2007) research, were concerned about how they would manage the responsibilities of work and family [5]. The research linked this concern with, among others, the long hours and lack of flexibility that is present in the industry [5]. On the other hand, women overperform and thus put more hours in to prove themselves [46]. Which suggest the importance women put on their career. Additionally, Lee and Carver (2019) found that a barrier to participating in FLOSS that women faced was family responsibilities and only women mentioned family responsibility as a barrier [42]. This focus on family responsibility suggests the importance of family to these women. However, none of these cases proves that women are more family-oriented than career-oriented.

## 2.3 The intersection of age and gender in the workplace

Lastly, we will examine research discussing both gender and age. Rodríguez-Perez et al. (2021) found in their literature review that 6% discussed both gender and age [20]. It is important to note that these articles do not necessarily discuss the intersection or equally discuss both aspects. This low percentage shows the lack of research about the intersection of age and gender within software engineering. Thus we will also look beyond software engineering.

Firstly, we see that people feel discriminated base on both gender and age [2]. Bandias and Warne (2009) found in their survey that the women over the age of 50 not only felt discriminated against because of gender but also age [2]. More specifically, they had comments about not knowing how to deal with competent women in management roles but also mentioned then ageism was more of an issue than gender.

Additionally, when discussing motherhood, we see discrimination related to age and gender. Griffiths et al. (2006) looked at women throughout their ICT careers at different ages [3]. The research saw that a career could progress differently depending on factors that are unique to women, such as motherhood [3]. Another research by Griffiths et al. (2010) found in an interview with a 40 to 45-year-old woman that the organization became chilly after becoming a mother [4]. Women also thought that it was harder for other women to return after childcare to the field due



to the industry’s volatility [9]. However, older women in the same industry disagreed; while they lost some confidence, they were prepared to be adaptable and flexible [9].

In several cases, women were made redundant based on their age. Griffiths et al. (2010) found that women were made redundant against their wishes and left the industry. A specific comment made was: “they weren’t looking for women over 50 for a start, so after a while, I gave up looking” [4].

Being made redundant could also affect how many women move into self-employment. Bandias and Sharma (2016) also found that more women move to self-employment past the age of 54 [7]. Additionally to being made redundant, the lack of advancement might play a part in this movement to self-employment.

Several women felt the effect of the glass ceiling as they climbed to the corporate ladder [4]. This glass ceiling has been seen by more research inside and outside of the industry [6, 51, 52]. The glass ceiling is defined as: an “unseen, yet unbreachable barrier that keeps minorities and women from rising to the upper rungs of the corporate ladder, regardless of their qualifications or achievements” [53]. Bandias and Sharma (2016) found that it becomes more difficult for older women to achieve career advantage over time, even though the women have a high level of technical abilities [7].

Moreso, age is perceived differently between men and women. Duncan and Loretto (2004) found that women are considered older sooner than men’s colleagues, as women in their 30s were considered too old for promotions [54]. However, other women who succeeded within the industry mentioned that the glass ceiling is breakable, but one has to be smarter than average to break the old boy’s network [6].

Another part of ageism for women that men do not face is that they are never the right age; they are either “too young” or “too young” [54]. Women mention age discrimination related to their physical appearance and sexuality [54]. This belief was reflected in how a woman felt like she needed to lose weight, wear high heels, and be more glamorous if she looked old [55].

The research relating to age and gender shows how intertwined the two aspects seem. This can also be seen in the subsections about age and gender. Both the stereotypes of age and gender seem to overlap somewhat. See poor performance and lower ability stereotype in age and less competent stereotype in gender. These stereotypes are regarding the competency of the person. Thus an older woman might be seen as less competent due to age, gender, or both. Similarly, this can be seen with the stereotype that women put work secondary and that older workers are unwilling to put long hours into their work. These similarities show the complexity of gender and age intersection. Griffiths and Moore (2010) summarize the complexity of the intersection of age and gender, “Our interviews suggested that age cannot be isolated as just one problem women face in ICT, but contributes overall to their stressful situation” [4].

We can see the limitations and complexity regarding the intersection of age and gender from the literature. There is a lack of research and knowledge regarding the experiences of older women in software development and how they remained within the industry.

## Chapter 3

# Methodology

This chapter presents the research method used to answer the research question. We performed a Qualitative Survey as described by ACM SIGSOFT.<sup>1</sup> The research goal is to gain a broad understanding of age and gender within the software development industry as they relate to survivorship. The research is started with limited knowledge, and data is gathered through semi-structured interviews with open-ended questions as described by Seaman (1999) [56] and using the guidelines of Strandberg (2019) [57]. The interviews are transcribed and coded, and then the codes are analyzed. Eventually, the codes are put in perspective with the current literature where a theory is produced. The chapter is divided into sections to discuss the different parts of the process.

As this is a qualitative survey involving people, before the start of the research, ethical approval is needed, which was given by the Ethical Review Board of the TU/e<sup>2</sup>.

### 3.1 Demographic

Because the research goal is to gain a broader understanding of our demographic, we only look at this group of people, and people outside that group are considered out of scope.

The demographic we are examining consists of two parts, gender, and age. Gender is self-determined by the participants. We are specifically looking at women. However, we do not exclude anyone whose gender is on the non-binary spectrum. This inclusion is done to determine if the results can be (partially) generalized toward non-binary people. For age, we take 40 as The Age Discrimination in Employment Act of The United States of America, which forbids discrimination against those 40 and older [58]. Additionally, the average graduation age for college in the USA is around 23 years [59]. Which would mean if someone immediately started working by 40, they would have 18 years of experience. However, we do not immediately exclude those younger than 40 and with less than 18 years of experience. Some research suggests that software developers are considered old at 30+ [31]. Thus, we use the age of 40 and 18 years of experience as guidelines. Nonetheless, we mainly study women of at least 40 years with 18 years or more years of experience.

### 3.2 Invite procedure

The entire process of the invite procedure can be seen in Figure 3.1. For the interviews, we need participants who fit the specific demographic of this research. Thus, we select individuals most useful for the purpose of this research. Thus we use Purposive sampling as described by Baltes and Ralph (2021) [60]. Additionally, because the demographic can be hard to reach but the members of the sample might know others that are within our demographic. Thus Snowball sampling was used as described by Baltes and Ralph (2021) [60].

---

<sup>1</sup><https://acmsigsoft.github.io/EmpiricalStandards/docs/?standard=QualitativeSurveys>

<sup>2</sup>ERB reference: ERB2021MCS13

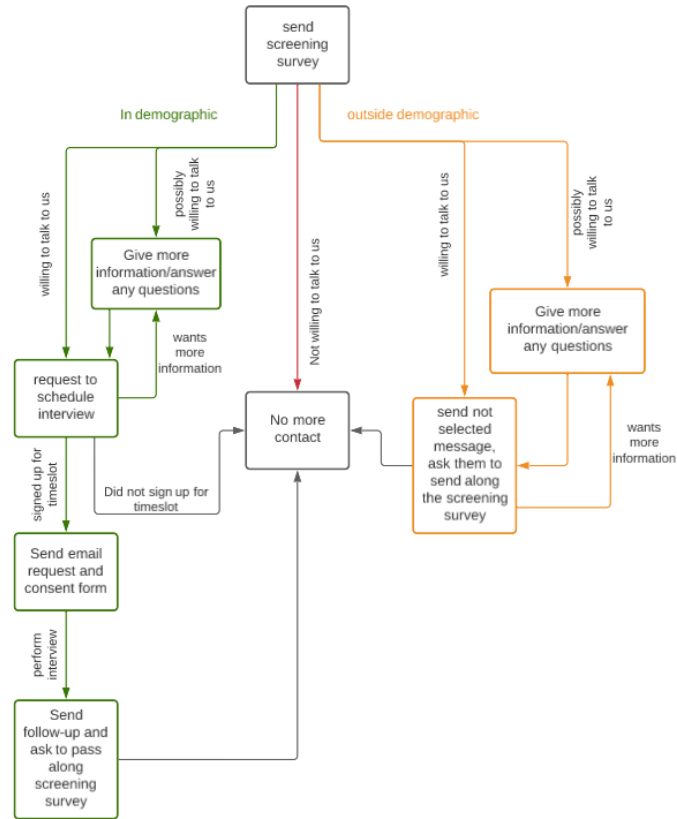


Figure 3.1: The process of inviting a participant

We contacted possible participants through Twitter. We selected this method of contacting for one reason specifically. Older women developers with a prolonged careers could be considered a difficult group to get in contact with. Twitter is commonly used for discourse, and it was known that such discourse pertains to age and gender within tech. Thus using Twitter to contact possible participants seemed to be a good method to find the sample. Other social media could be used. However, certain social medias were discounted due to its demographic (i.e. TikTok) [61, 62]. Other times Twitter was more preferred due to how people interact and its search functions (i.e., being able to search for topics).

Several Twitter threads that discussed being older in tech were selected (see example Tweets in Figure 3.2). These threads were identified by using a keyword search. The keywords used are:

- Women in tech ageism
- Older women in tech
- Women engineers 40s

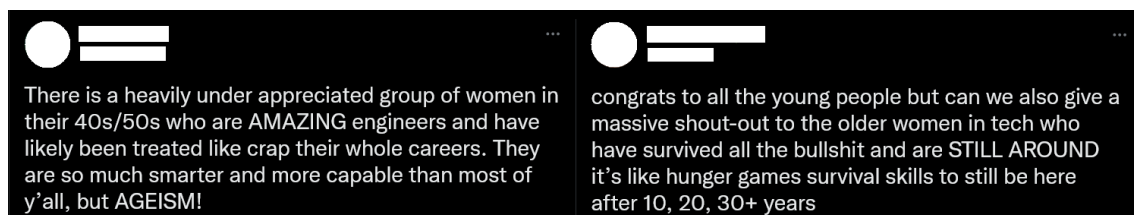


Figure 3.2: Examples of Tweets used to find participants.

The data of the people who took part in the threads were collected using the Twitter API. We received access to the API after approval from Twitter. A few methods for people to interact with the threads were; they either replied to the thread or to someone else in the thread. They might have retweeted the original Tweet or Tweets in the thread. We parse through the data to determine the gender of the Twitterers. This determination was done by taking their profile and searching for gendered terms (such as “mother”, “wife”, “sister”) or pronouns that could be used to identify the gender of the person (for the entire list, see <sup>3</sup>). We performed a manually checked the results for this to ensure we identified people who were likely to be women or non-binary. The gender was later confirmed by the screening survey and the interview. Other information, such as years of experience, was also gathered when it was available. This data was used to determine whom to contact. We contacted everybody we identified as women, non-binary, or “could not be identified” unless:

1. Their Twitter profile indicates less than 18 years of experience
2. They worked in a different industry than software development
3. They deleted the tweet
4. They deleted the account

The first two reasons were determined based on the person’s response to the original tweet, their biography, or information on a website. We used Twitter as the primary method to contact people by sending them a private messages. We only send private messages to maintain the person’s privacy if they did decide to partake in the research. However, some did not allow private messages from people whose profiles they were not following. In this case, other possible contact methods were used, such as emails, contact forms on websites, or LinkedIn. These methods were only possible when the person had linked their website, or LinkedIn linked in their Twitter account. When LinkedIn was used, the contact message was sent when making a connection with someone. If there were no other methods to contact the individual, the author followed the person’s profile. This could lead to the person following the author back, and then a message could be sent.



Hi!  
 We're a team of researchers from Canada, The Netherlands, and Germany, studying the intersection of ageism and sexism in the software industry. We saw that you participated in a related Twitter thread (twitter.com, 'stat...) and wanted to ask you whether you'd be interested in talking to us about your experiences?  
 If you are, please fill in this very brief screening survey: forms.office.com/r/NVmHvOXNkp  
 Sincerely,  
 Sterre

Figure 3.3: The contact message that was send to possible participants

The message sent to the possible participants contained a link to a screening survey and a request to fill in this survey. See the message in Figure 3.3 and the screening survey in Appendix A. In the screening survey, we ask for gender, age, and the number of years of experience to determine if they are a part of the target demographic. Additionally, we ask if they are willing to participate in an interview, and if they respond “yes” or “maybe”, the survey asks for an email address. This email address is used to contact them later to invite them for an interview. Those who respond “maybe” can leave questions related to the research, which will be answered in an email.

<sup>3</sup><https://7esl.com/gender-of-nouns/>

If they do not have specific questions, they are given extra information in a follow-up email. Those who fit into the demographic and responded “ye” or “maybe” in the screening survey are asked to schedule an interview through a scheduling web application. The interviewees can select a predefined timeslot in the scheduling app that suits them best. The interview is then planned through Microsoft teams, and an email with the consent form is sent. Before the interview can take place, the consent form needs to be signed (Appendix B).

### 3.3 Interview

The interview is semi-structured with open-ended questions. The questions in the interview questions were written to best answer the research question. Additionally, some of the literature mentioned in Chapter 2 was used to write some of the questions, as well as some additional literature. The questions in the interviews were designed to go from a broad perspective to a narrow such to allow the interviewee to share their perspective and experience without being influenced by the interviewer. We will discuss the interview script per section. The entire interview script can be seen in Appendix C.

#### 3.3.1 Demographic

The demographic questions repeat some of the screening survey questions as explained at the start of the questionnaire. The repeat is due to the GDPR. When partaking in a screening survey, the participant has not yet signed the consent form, which is why the data from the screening survey cannot be used for processing [63]. The demographic questions were asked so that the interviews and thus data can be put into context.

#### 3.3.2 View of the industry

The questions regarding the *View of the industry* were asked as a jumping point to gain a broad overview of their experiences. The way they view the industry could give context to future answers. It can give the opportunity to ask later in the interview why or how they handled certain positive or negative experiences. Additionally, it can give insight into experiences and thus is useful for the research question relating the gender and age based experiences.

#### 3.3.3 View of the industry (age & gender)

The questions related to *View of the industry* relating to age and gender were asked to determine how their age and gender affected their career. Additionally, to get more specific experiences regarding these topics. Moreover, it asked how their working atmosphere has affected these experiences so that we can learn how the workplace can affect the experiences. It also cues them to discuss how they dealt with the age and gender experiences, revealing strategies that they use. Additionally, there is a question regarding task assignment as research has shown that women get assigned tasks differently [49], but there is a lack of research seeing if age plays a part in task assignments. The questions in these questions are part of the answers related to the research question about strategies, experiences, and task assignments.

#### 3.3.4 Feeling under-valued

The questions regarding *feeling undervalued* are specifically added to see if the interviewees felt valued and if it changes throughout their careers. These questions are there to answer the research questions relating to feeling valued. Their answers can also prompt more strategies for dealing with feeling undervalued, which gives more answers to the research questions related to strategies.

### 3.3.5 Feeling like leaving the field

These questions relating to leaving the field have been asked for several reasons. Firstly, it would add to the research on why the women left. Moreover, because the demographic is older women developer, it will give more insight into why they would leave before retirement after an already lengthy career. Secondly, it would give insight into women's experiences that might make them consider leaving and why they decided to stay. These questions are asked to answer the research question related to the feeling of leaving. Lastly, The answers might lead to follow-up questions about how they dealt with this feeling and what strategies they used to stay. The questions regarding a career switch can lead to more knowledge as to why people make a change in their career, and a switch might be a possible strategy that people use. Thus, insight can be important. Thus these questions can be used to answer the main research question.

### 3.3.6 Gender and age-specific strategies

These questions directly ask for the strategies the participants have been using and ask for more details regarding the strategies. The questions might reveal new strategies that were not mentioned before and could reveal more information regarding strategies already mentioned. Thus these questions are related to the research question related to strategies.

### 3.3.7 Existing literature

The existing literature question is to see if the interviewees also experienced or did strategies mentioned before and how they feel about the strategies. The strategies used for the gender related strategies came from the research of Wijayawardena, et al. [39]. The age related strategies were mentioned by Baltes et al. [31]. These questions directly go to the main research questions regarding strategies. Note that the examples given for any strategies might change between interviews or even be based on answers other interviewees have given before.

As mentioned, the interviews are semi-structured, meaning during the interview, questions not in the script might be asked if the interviewee mentions anything of interest.

Before the recording starts the interview, the interviewer introduces themselves and discusses the consent form. When discussing the consent form, the rights of the participants repeated to unsure that the consent form was understood. The interviews are recorded and automatically transcribed. At the end of the interview, and with a follow-up email, the interviewees are thanked and requested to send along the screening survey to people they know to get more interviewees through snowballing.

## 3.4 Processing the interviews

The automated transcripts and the recordings are used to transcribe the interviews, as the automatic transcription is not perfect. We recorded both audio and video. However, the participant had the option to turn their camera off. These recordings are not shared with anyone and are deleted once the research is finished. Before transcribing, the interviews are preprocessed to remove the timestamps Microsoft Teams add and to remove the name of the interviewee and interviewer. For this preprocessing, a python code is used; see Appendix D. The interviews are anonymized and then coded. Information such as names, workplaces, the city lived in, or any other identifying information is anonymized. For the transcription and coding, the program MAXQDA<sup>4</sup> is used. The interviews are coded one by one, going from the first to the last. Coding guidelines can be found in Salaña (2016) [64].

The process of coding was straightforward. For any mention related to strategies and experiences, it was determined if it was due to gender and/or age, and based on this determination. The segment received a specific code. Any mention relating to any of the research questions was also

---

<sup>4</sup><https://www.maxqda.com/>

coded. Different code segments were grouped together on a commonality, such as age or reason for feeling undervalued.

During coding, we record when modifications to the codebook as described by Seaman (1999) [56]. A codebook is the list of codes gained from the coding of the interviews. The codebook can be modified by, i.e., adding new codes, deleting codes, or changing the definitions of codes. This is done to simplify the saturation calculation. Saturation helps determine if the data is adequate. When saturation is researched, no new codes should be found. All interviews are coded before the saturation is calculated, and all coded interviews are included when calculating the saturation. The saturation is calculated based on the following criteria:

- Initial analysis sample: 6 interviews
- Saturation criteria: After six interviews, every two subsequential interviews (set) are taken to determine saturation. Saturation is reached when at a given point in the data collection,  $\leq 5\%$  new information is found. Thus 95% or more codes were present in the final codebook.

These Saturation criteria and saturation calculation is based on research performed by [65]. The saturation criteria can be phrased as a metric. Specific saturation metrics:

- If, after coding  $N$  sets, 5% or less of the codes were present in the  $N-1$  set, saturation is reached.
- $N \geq 4$

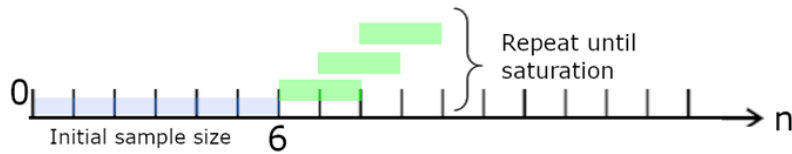


Figure 3.4: Saturation Metric

What are considered changes:

- Adding codes
- Deleting codes
- Changing the meaning of the code (a.k.a, when the code is used)
- Adding a new category
- Changes to the hierarchy that are not cosmetic if they are born from an interview

Changes that are not considered:

- Changing the names of code.
- Changes to a code's definition do not change when a code is used.
- Changes not stemming from the interviews

To calculate the saturation the following formula is used:

$$saturation = \frac{\text{num of codes in set} + \text{modifications}}{\text{num of total codes in final code book}}$$

This calculation is used to determine if the 95% is reached. When the saturation criteria are reached, no more new people will be contacted to request participation in this research.

Several coding iterations are done to assure nothing was missed and to organize the hierarchy of the codes. In total, two coding sessions were done over all interviews, but the codes were checked more often than twice during the analysis. Through the analysis of the code snippets, they were checked again and possibly changed when needed. The changes during the analysis were possibly combining codes, changing hierarchy, renaming codes, and adding coding to specific code snippets. These changes did not stem from the interviews but the context of all interviews or increased readability. No new codes were added during this process, and no codes were deleted. The code snippets are analyzed and compared. Additionally, the code snippets were put into context. When coding, we also added codes relating to context; for instance, if something happened in their early career, we would code this with an early career code, similarly for later career related code segments. Moreover, we also code when code segments mention reasons for strategies or benefits or disadvantages of strategies. Keeping track of these will allow for more understanding of the codes, and it will help during the analysis. When the analysis started, we looked at all codes within MAXQDA's Smart Coding Tool <sup>5</sup>. Within this tool, we can look at all the code segments separately per code and see all the overlapping codes and context related codes. This allows us to be able to, for instance, see if codes happen more commonly in early career or later, but also to see what the benefits of those strategies, etcetera. We do this for every code. The results of this analysis can be seen in the next chapter.

When discussing the results relating to the codes, we only give quotes for privacy reasons. To preserve the interviewee's privacy, we do not give the full context for every person or code. We also do not give context that was not common for the codes; for instance, we do not discuss if something happens in the early or late career when most code segments do not have this context. However, please contact the researcher for any more information regarding the results of the codebook. The entire codebook can also be seen in Appendix E.

Within the results, We will present the codes as they pertain to the research questions. The names used are randomly generated unisex names. Every interviewee was assigned a name to make it easier to talk about them and keep their anonymity.

---

<sup>5</sup><https://www.maxqda.com/help-mx20/05-coding/smart-coding-tool>



# Chapter 4

## Results

This chapter will present the results from the interviews, including a discussion regarding the saturation criteria, the participants, and the code analysis.

### 4.1 Saturation

For the saturation criteria, see Section 3.4. After the first six interviews, the modifications were tracked down. As mentioned in the methodology, we both kept track of the changes in all the codes and changes in specific codes relating to strategy. We will discuss both, starting with all the codes. The modifications for all codes per interview can be seen in Table 4.1. After case 7, a saturation of 95% is met at case 4 (interviews 10 and 11), as can be seen in Table 4.2. This means that 95% of all codes were found by interviews 10 and 11, which aligns with the literature stating that the stopping criteria are commonly met at interview 12.

The saturation was calculated using:

$$saturation = \frac{\text{num of codes in set} + \text{modifications}}{\text{num of total codes in final code book}}$$

The number of total codes in Table 4.1 is obtained by adding the aggregated number of changes to the previous number of total codes. The set's saturation was then calculated by taking the total number of codes of the last interview in a set and dividing that by the total number of codes in the final codebook. A set is two subsequential interviews.

Interviews	new codes			Total codes	
	Deletion	Modifications	Aggregation		
Interview 7	12	0	0	12	234
Interview 8	8	0	0	8	242
Interview 9	7	0	0	7	249
Interview 10	16	0	0	16	265
Interview 11	4	0	0	4	269
Interview 12	4	0	1	5	274
Interview 13	6	0	0	6	280
Interview 14	3	0	0	3	283

Table 4.1: Changes made in the last 8 interviews for all codes

Num Sets	Total codes	Saturation
SETS 1 (7 & 8)	242	0.86
SETS 2 (8 & 9)	249	0.88
SETS 3 (9 & 10)	265	0.94
<b>SETS 4 (10 &amp; 11)</b>	<b>269</b>	<b>0.95</b>
SETS 5 (11 & 12)	274	0.97
SETS 6 (12 & 13)	280	0.99
SETS 7 (13 & 14)	283	1

Table 4.2: Saturation calculations for all codes

The modifications for codes relating to strategies per interview can be seen in Table 4.3. For the codes relating to strategies, a saturation of 95% is met at case 5 (interviews 11 and 12) with seven cases, see Table 4.4. This is a case later than the saturation relating to all codes but still in line with the literature.

Interview	New codes for strategy	Deleted codes in strategies	Mods in strategies	Sum of strategies total strategies codes	Num sets	Total Codes Strategies	Saturation
interview 7	9	0	0	9	SET 1 (7 & 8)	111	0.82
interview 8	2	0	0	2	SET 2 (8 & 9)	116	0.86
interview 9	5	0	0	5	SET 3 (9 & 10)	124	0.92
interview 10	8	0	0	8	SET 4 (10 & 11)	127	0.94
interview 11	3	0	0	3	<b>SET 5 (11&amp;12)</b>	<b>128</b>	<b>0.95</b>
interview 12	0	0	1	1	SET 6 (12 & 13)	133	0.99
Interview 13	5	0	0	5	SET 7 (13 & 14)	135	1
Interview 14	2	0	0	2			

Table 4.3: Changes made in the last 8 interviews for all codes related to strategies

Table 4.4: Saturation calculations for all codes related to strategy

The main research question is in regards to strategies. This is why we single out codes related to strategy. We check the saturation for strategies to ensure we can say with a high likely hood that no new strategies can be found.

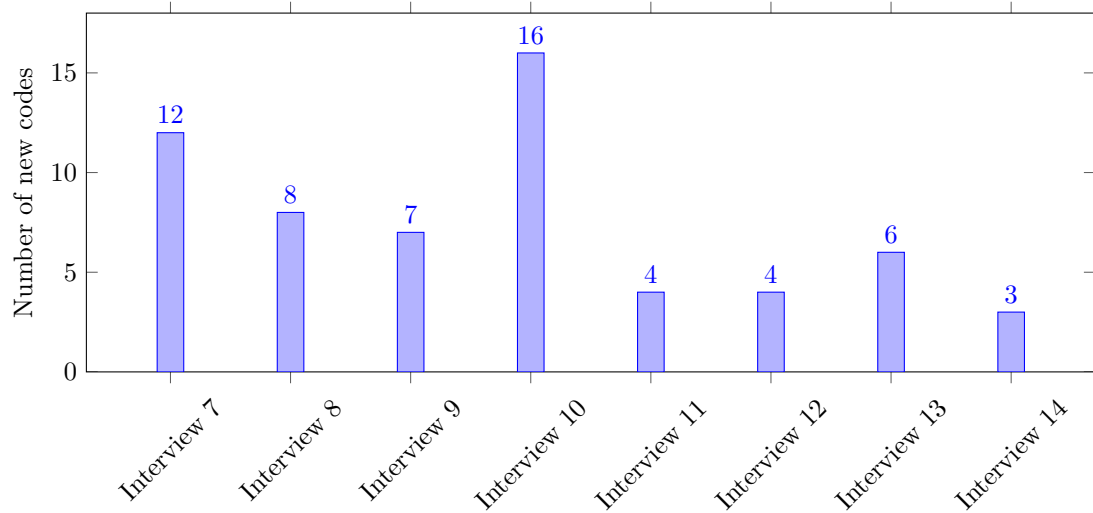


Figure 4.1: Number of new codes for all codes

When we look at Table 4.1 and Table 4.3, we see a large increase of new codes at interview 10. In total, 15 new codes are added, of which eight are related to strategies. The new codes per interview for all codes and codes related to strategies can be seen in Figure 4.1. One would expect that the number of new codes would decrease with every interview, as most codes have already been found previously. This expectation is why interview 10 stands out. A reason for this could

be that the participant of interview 10 was a Person of Color, which was mentioned during the interview. Research shows that Women of Color have to negotiate spaces of sexism and racism, and they often experience isolation [66]. Thus, a Person of Color may find strategies and have experiences that deal with the intersection of race and gender, which might be why we see an increase in new code with this interview.

We will discuss more demographic information in the next section.

## 4.2 Demographic information

In the end, fourteen people were interviewed between the 1st of November 2021 and the 10th of January 2022. We will discuss the demographic of the participants to show that we have a diverse group of participants. First, we look at the age distribution and the distribution of years of experience. These distributions can be seen in Figure 4.2 and Figure 4.3. In Figure 4.2, we can see we have a wide distribution of age, with 60+ being the largest group. In Figure 4.3 we see the distribution of years of experience the participants had. The graph shows that the 18-24 years of experience is the largest group. With the age distribution, we would expect more people with 30 to 39 as their years of experience. However, it is possible that several participants entered the field at a later age than 23. It was not specifically asked when people entered the field; however, some participants did mention a Ph.D. or a master's degree. There is an additional reason why we are specifically missing people with 30 to 34 years of experience, which is a decrease in granted computer science bachelor's degrees between 1983 and 1993 [67]. The gap at 30 to 34 years of experience could be explained by the decrease of women obtaining a bachelor's degree in computer science. The interviewees also noted this decrease. They mentioned a decrease of women entering the field after the mid-eighties, which suggests that this decrease was also felt in the industry.

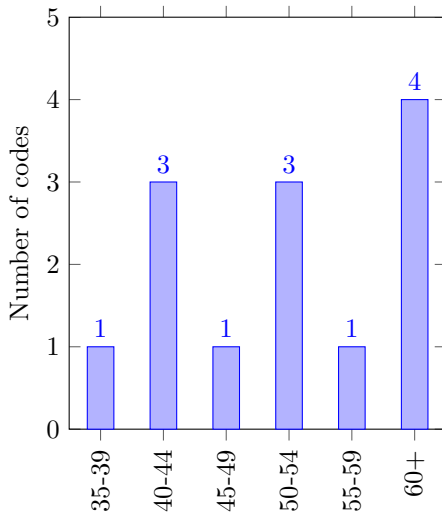


Figure 4.2: Age distributions

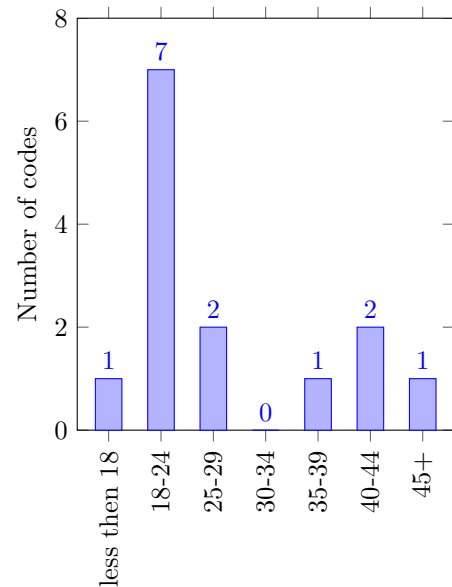


Figure 4.3: Distribution of years of experience

We did not only look at age and years of experience but also other demographic aspects such as gender and if the participants are currently working in computer development. The gender distribution can be seen in Figure 4.4, and the distribution of participants working in software development is shown in Figure 4.5. For gender, we used the same terminology used by participants, except where they did not distinguish between gender and sex, in which case we used ‘woman’ rather than ‘female’. While it was not asked, one of the interviewees mentioned

Between female and non-binary

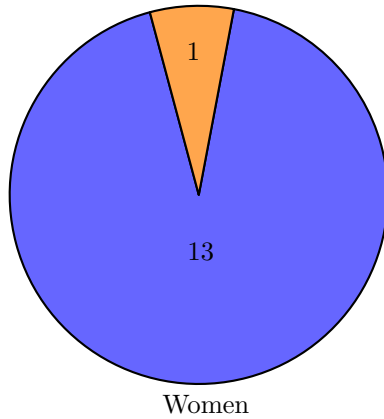


Figure 4.4: Gender distribution

Not working in SD

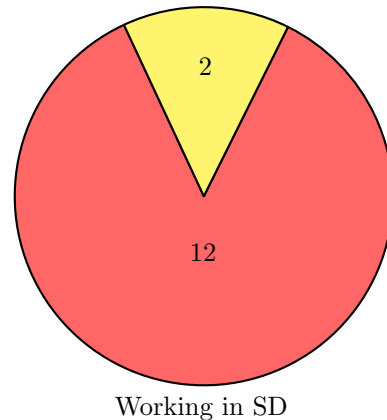


Figure 4.5: Distribution of working in software development

that they were transgender during the interview. Additionally, one of the participants mentioned that they were cis-gendered. We do not know if the remaining 11 women were trans- or cis-gendered. Regarding the distribution of participants working in software development, we see three participants not working in software development at the moment. One of the participants plans to return to the software development industry. The other participants are trying a start-up and thus not actively working in software development but are still working within the industry. We also noted that the person who is not working in software development left the industry approximately five months before the interview took place.

The demographic information relating to gender, age, years of experience, and currently working in software development was explicitly asked during the interviews. However, more data was collected as demographic information was mentioned throughout the interviews. The other information gathered was their ethnic background, place of work, parenthood status, the specific industry the participants worked in, if they left the industry at some point throughout their career, and if they made a career switch (i.e., consultancy). Because these were never explicitly asked, there may be missing data. However, the interviewees thought it was important to mention these topics.

Ethnic background was not asked during the interview. However, two participants mentioned their race at a point during the interview. One identified themselves as a Person of Color, and the other participant mentioned that they were Korean. For the rest of the participants, their ethnic background is unknown and not mentioned. It would suggest that ethnic background might play a role in a person's experience because the participants mentioned their ethnic background unprompted. Thus ethnic background was coded because its another diversity aspect that might intersect with age and gender.

Place of work was also specifically not asked during the interview; however, it was able to be inferred by the stories the participants told. For some participants, it also changed throughout their careers. For instance, at the point of interviewing, four people are located in Europe, specifically Western or Northern Europe. One person worked a large part of their career in North America. Similar to those currently in North America, some have worked on different continents. This data was noted as different cultures can look at age differently [22].

Four participants mentioned that they were parents during the interview. There can be several reasons why we only have a few identified parents. Firstly, it is possible that there were more parents, but they did not mention it. Secondly, statistics show that women with a higher degree (i.e., bachelor's degree, master's degree) are less likely to have children than those without a higher degree [68]. Lastly, research shows that mothers in a male-dominated industry who are

overworked (50+ hours a week) are more likely to leave their occupations compared to men and childless women [69]. So it could be the case that there are fewer mothers in software development that would have fit our demographic. We noted parenthood down as it has often caused issues for women in ICT [4]. As well as specific experiences and thus approaches might be able to lead back to this information.

The career switches made by the participants can be seen in Figure 4.6. Four different career switches were identified, *from consultancy to company*, *into management*, *starting a company*, and *into consultancy*. It is possible that a participant did multiple switches. For instance, someone moved to consultancy earlier in their career and later decided to go back to a company as a manager. This would mean they are represented in 3 different career switches, *into consultancy*, *from consultancy into company*, and *into management*. Several participants appear in multiple career changes. One participant appears in both *into consultancy* and in *from consultancy into company*, and another three participants appear in these two switches plus into management. A participant both started their own company and moved into management. Not for all participants, it was noted if they made a career switch. Some stayed a developer, or some did not mention a switch made during the interview. The reason for keeping track of career switches is as certain career switches, such as *moving into consultancy*, or *into management*, is seen as a strategy for older developers [31] and we were interested if this was also seen in this research. Additionally, it could be useful for context and possibly see intersections between these switches and other codes.

Lastly, we kept note of the industries the participants worked in throughout their careers. The distribution can be seen in Figure 4.7. Their industry was not identified for three participants as this was not mentioned within the interview. This distribution shows that the sample covers several different industries within software development and thus that the sample is quite diverse. Only testing and web development/CMS are carried out by multiple people, which are among a few sectors where women more commonly work compared to others [70].

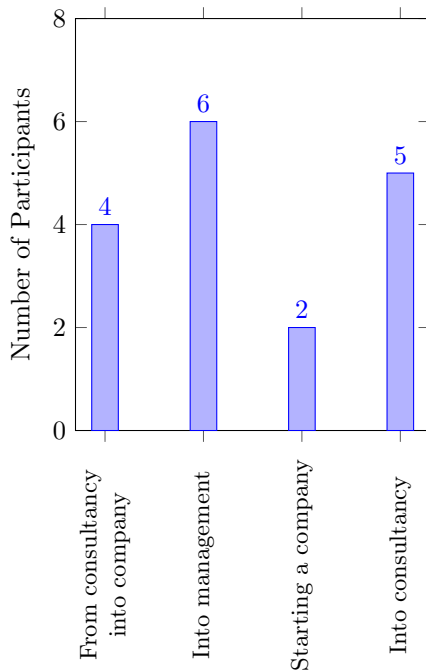


Figure 4.6: Career switches

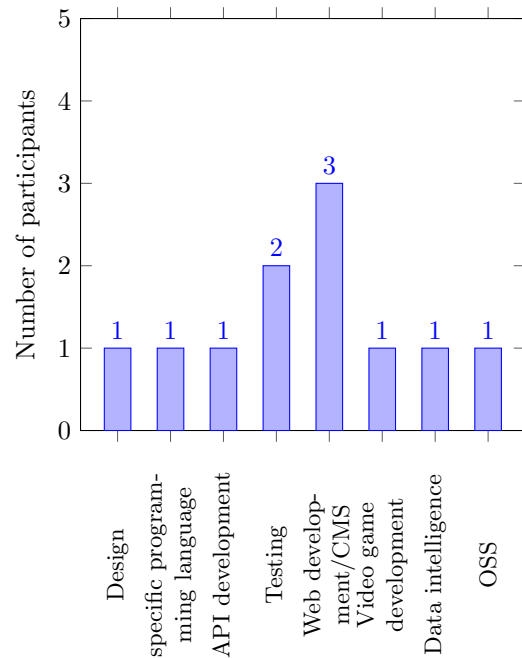


Figure 4.7: Industries the participants worked in

### 4.3 Code book

This section will present the entire codebook, excluding the demographic-related codes. The codebook consists of two hundred eighty-three codes, excluding the demographic-related codes. One hundred thirty-five of those codes are related to the strategies. All the codes can be seen in Figure 4.8. The colors of the different sections are there to increase readability and denote which sections belong together clearly. The numbers refer to the codings a specific code has. In other words, the number refers to how often something relating to that code was mentioned. All the codes are divided into three main categories.

1. Strategies contains all the codes relating to strategies.
2. Experiences contains all the codes relating to experiences the participants had.
3. Perceptions, which contains the perceptions of the participants.

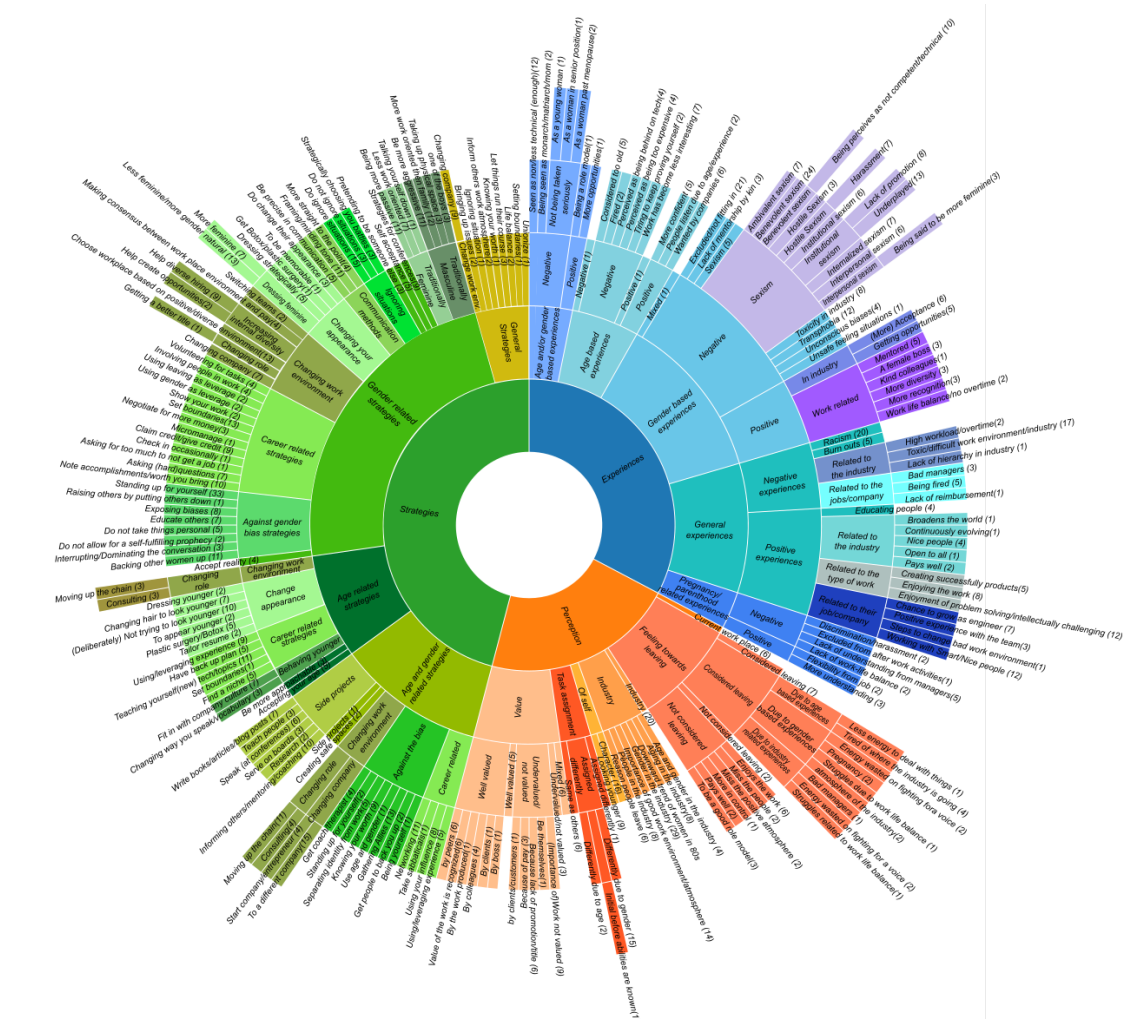


Figure 4.8: All codes including the number of code segments

### 4.3.1 RQ1: What strategies have women adopted that they perceive as contributing to their survival in software engineering?

Approximately a hundred and three strategies were identified from the interviews. These strategies can roughly be broken up into four categories: *age and/or gender related strategies*, *age related strategies*, *gender related strategies* and *general strategies*. We will discuss these strategies separately, starting with age and/or gender related strategies.

#### Age and/or gender related strategies

Age and/or gender related strategies counts 24 different strategies, which can be seen in Figure 4.9. We can see four separate groups: *Career related*, *side projects*, *Changing work environment* and *Against the bias*. Out of these groups, *Against the bias* and *Changing work environment* have the most code segments, with 37 and 35, respectively. Closely following is *Side projects* with 32 and last we have *Career related* with 25. There is one strategy not in one of these separate groups as it did not fit in any of the groups well, *Creating safe spaces*. This strategy makes the workplace better and is only mentioned by one person. Several other strategies are mentioned more commonly by multiple people.

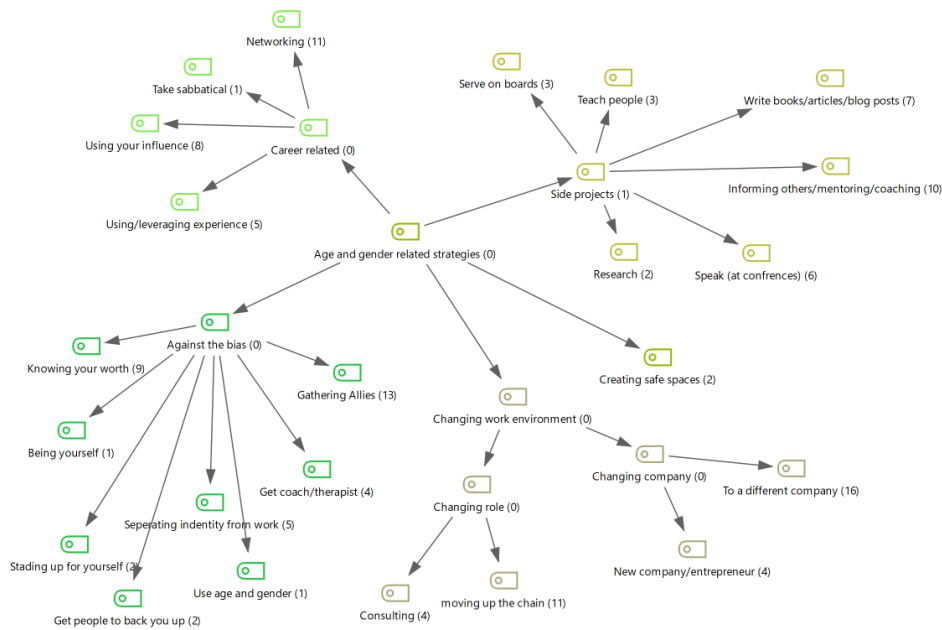


Figure 4.9: All codes in Age and/or gender related strategies

*Against bias* contains the several different strategies, which can all be viewed in Table 4.5. This table includes a short explanation of the strategy and the number of code segments.

All the strategies in *Against the bias* seem to have a core of trying to go against a gender and age bias the participants felt. For instance, the strategy *Use your age and gender* goes against the gender and age bias. The quote relating to this strategy brings up an interesting viewpoint.

“All those young guys don’t want their mom programming with them, their grandmother, on the other hand.” - Dani

Dani’s quote suggests that age might be considered a positive after a certain point. At least when discussing programming with young men. Additionally, it might give some idea of how aging affects women within the industry. Dani’s quote suggests that when women are middle-aged, they



Strategy	Short explanation	#code segments
Being yourself	Being yourself regardless of others even if they dishearten you	1
Gathering allies	Gathering a group of people which you share experiences and knowledge with	13
Get coach/therapist	Getting a coach or therapist to help manage certain situations and grow as a person	4
Get people to back you up	Getting people to back you up such that people listen to you or to get things done	2
Knowing your worth	Being aware of the value you bring to a company, job or yourself	9
Separate identity from work	Ensuring that your personal identity is not connected your work and that there is more to life than work	5
Standing up for yourself	Not allowing others to discourage yourself	2
Use age and gender	Allowing your age and gender to work in your favour	1

Table 4.5: The strategies that are contained within the Against Bias subcategory

are considered mothers, and when they are elderly, they are grandmothers. This highlights how women are thought of as motherly figures, which is seen in other strategies and experiences.

Several of the strategies in *Against the bias* have as a goal growth, such as *Get coach/therapist*.

“I worked with a career coach ... I started taking more personal responsibility for what I could control and what I couldn’t control. ... but I can control where I invest my time, and so there was like a big paradigm shift.” - Charlie

Additionally, *Get coach/therapist* can help with learning the other strategies such as *Knowing your worth*, *Separate identity from work*, *Being yourself* and *Standing up for yourself*.

“I don’t have to tie myself and my failures to failures themselves; they can be wins. I can fail and not have my work valued, but I personally can value it, and I can learn from it. And I’ve just shifted my mindset. I think therapy actually has helped a lot with that” - Charlie

Charlie illustrates both *Knowing your worth* and *Separate identity from work*, as they do not tie themselves to their failures as well as value their work regardless of its success. Charlie was not the only one who put mentioned these two strategies. Five interviewees mentioned *Knowing your worth*, and four mentioned *Separate identity from work* during their interviews.

The most commonly mentioned strategy in this group *Gathering Allies* also is related to growth. *Gathering Allies* is most commonly mentioned with 13 code segments by six different participants. Why the participants start *Gathering Allies*, all have a similar underlying reason to have support from like-minded people who can help each other. These allies are used to learning from each other, which can help advance careers.

“Most of the clarity I’ve gained over the last five years is due to relationships I’ve built not only with coworkers but online with like-minded people of the same or higher levels either in design or in just technology in general. [There are a] couple of slack groups I’m on that are very helpful in terms of comparing behaviors and management techniques, or picked up a lot of management techniques from talking to peers who aren’t within the company.” - Jaime



Jaime's quote clearly shows that *Gathering Allies* is not just confined to within an organization. Online platforms, such as LinkedIn, are more commonly used to *Gathering Allies* and to communicate. Additionally, these groups are not closed off to newcomers. Interviewees such as Alex and Jaime suggest that women reach out to others.

"There are women like us that have been around. We know; we have strategies. We have ways to work through this we have. We can help. Just don't be scared to reach out. I answer all the LinkedIn" ... - Alex

*Gathering Allies* is very similar to the *Networking* strategy in *Career related*. The main difference is that *Networking* is mostly focused on building a network to help their career. At the same time, *Gathering Allies* also has more of a personal support system connected to it.

*Networking* is the most commonly mentioned strategy in *Career related*, with 11 mentions by 6 interviewees (Alex, Noah, Charlie, Jamie, Riley, Jackie). All the strategies in *Career related* can be viewed in Table 4.6.

Strategy	Short explanation	#code segments
Networking	Create a group of people to help advance ones career.	11
Take sabbatical	Taking a extended period of leave from ones job to pursue something else or to take rest.	1
Using your influence	Using the influence gained through their career to help advance their career and to be an agent for change.	8
Using/leveraging experience.	Using ones experience as a career security and leveraging it as a reason to be listened to and respected.	5

Table 4.6: The strategies that are contained within the Career related subcategory in age and gender related strategies

The *Networking* strategy is often used to find work and advance one's career, as demonstrated by the following quote.

"The job I have is because I, you know, I knew somebody whose husband worked at this company ..." - Stevie

The focus of these networks is not just work related. While they are used for that purpose, Jaime stated the importance of not just having work related contacts.

"So I mean younger people. They need to create relationships that aren't just work based. They should not just take what they're given." - Jaime

Jaime's quote highlights where *Gathering Allies* and *Networking* seemed to overlap partly. Moreover, some of the interviewees, such as Noah and Riley, gathered allies and created networks with them.

"And I mean gender does play into it, in that you know a lot of my network started. With people of marginalized genders supporting each other." - Noah

"Most women end up working with other women because of the Whisper network." - Riley

These quotes highlight how women and other marginalized people group together to create their own networks. This is also seen within the literature [71]. Tattersall and Keogh (2006) found that a benefit of these networks is helping women feel included. Additionally, these networks are a method women use to share experiences and provide mutual empathy [71]. We see this last part more in *Gathering Allies*. On the other hand, one of the women also shared a negative about *Networking*.

“[Networks] can be very exclusionary. So I’ve seen that.” - Jaime

The context behind this quote is that Jaime lives in a city in the USA where they are very network-oriented, and thus if a person has a network, they will find a job. This also shows that it might be harder to find jobs and progress one’s career if one does not have a network. Additionally, a newcomer to this field might not have this network built yet and might find it challenging to create a network, which is where they might get excluded. However, as mentioned in *Gathering Allies* that one should reach out through, for instance, LinkedIn. Still, there is a privilege in being able to reach out to people and create a network, which might mean the strategy is less feasible for some.

Stevie suggested that meetings and the strategies in *Side projects* helped her stay within the industry, and women who did not do the same left the industry.

“[Others] didn’t go try to learn other stuff. They didn’t put their hand up when there was something new to do. They didn’t go, I’d like to attend the conference. ... If I spoke at a conference, I could go for free. And that wasn’t easy to start doing, but then I got ... to learn a lot, meet a lot of cool people. So that was transformative, and that helped me have a better career in a lot of these people- women that I know either change career got out of IT or retired early.” - Stevie

Stevie goes to conferences which is a strategy a part of the group *Side projects*. Jackie also linked side projects as a reason why they were as successful.

“I’ve been writing consistently, and I think that the consistency of my writing and the consistency of my speaking has helped people see me as somebody.” - Jackie

Not only is speaking at conferences considered are considered *Side projects*, but also writing books or blogs also are *side projects*. The strategies in *Side project* can be seen in Table 4.7

Strategy	Short explanation	#code segments
Informing others/ mentoring/coaching	Teaching, mentoring or coaching others in and about the industry	10
Research	Being apart of research teams or performing research themselves	2
Serving on board	Serving on boards of for instance journals, non-profits.	3
Speak (at conferences)	Speaking at for instance conferences or companies.	6
Teach people	Education others at for instance school or university	3
write books/articles/blog posts	Authoring or being co-authoring books, articles, blog posts etc.	7

Table 4.7: The strategies that are contained within the Side projects

For all side projects, it is the case that they are doing besides their regular job. Besides helping

advance other careers, there is a large element of helping others involved.

“Try to do what we can you know for the younger women and younger non-binary people and you know the younger trans people.” - Elliot

However, many participants saw the side projects as positive, such as Jackie, Stevie, and Bobbie. There are some negative aspects linked to it. In an earlier quote, Stevie mentioned that these strategies are not easy to get into, which is another negative. Another negative was related to an experience Stevie had.

“I had a good job offer. But the intellectual property agreement. I couldn’t sign it because I have a lot of intellectual property and the way they had it worded. Yes, the chances were slim that they would do it, but they could potentially have taken possession of my intellectual property, which I owned jointly with my co-author and other people like the risk was too much.” - Stevie

What Stevie experienced might be why some people cannot start doing side projects. However, there is a strategy mentioned that would resolve that, which is *change companies*, which is a part of *Changing work environment*. The entire list of the strategies apart of *Changing work environment* can be seen in Table 4.8.

Strategy	Short explanation	#code segments
Changing companies	(1) Moving <i>to a different company</i> then you worked for before.	(1) 4
	(2) Starting your own <i>new company</i> .	(2) 15
Changing roles	(1) Going into <i>consulting</i> instead of being employed by a company.	(1) 4
	(2) <i>Moving up the chain</i> of command i.e to senior developer	(2) 11

Table 4.8: The Age and/or gender Strategies that are contained within the changing work environment

As can be seen *Changing companies* and specifically moving *to a different company* is often mentioned. There are 15 mentions relating to this strategy by eight people (Billie, Jaime, Noah, Riley, Robin, and Stevie). Robin, Jaime, Noah, and Sam saw leaving a job to solve specific issues they face. Such as the lack of promotions.

“It’s always easier to get promoted by going to a different company than it is where you’re staying put.” - Noah

Besides promotion, it is also used to gain a pay raise. Alternatively, moving to a different company is done when the current company or job is disliked.

“What I’ve recommended to younger people is, you know, think of it as a career, not a job. If it’s not working for you, find someplace that does. And just skip along like a stone until you know you’ve established your career. Don’t put up with bullshit.” - Jaime

Jaime also suggests that younger people should follow this strategy. However, others point out that having this as a strategy might not be possible for everyone.

“I’m lucky because I don’t have [a] mortgage. I don’t have anything I need to pay. If everything goes really terrible, I can stay with my friends for a while and ... get another job. So that way I’m lucky because if you have kids, family, you’re in [a] different position.” - Robin

Robin’s quote suggests that people with a mortgage, kids, and family might not be able to leave a job. Additionally, not being certain about finding a different job might also be why people cannot use this strategy. There is a suggestion that experience might be needed to use this strategy.

“I can pick my next job. I can pick from basically whatever I want. You know, I’ve got the experience.” - Riley

Thus without this experience, this strategy might not be possible, which might hurt those earlier on in their career. However, it is uncertain how much experience is needed.

Besides *Moving to a different company*, we also see women going into consulting. A reason mentioned for this is that they no longer wanted to be employees.

“I decided I was, I was done being an employee.” - Jackie

“I’m too old for I’m too old and curmudgeonly to put up with all the management BS” - Jackie

Additionally, wanting more control was given as a reason they decided to go into consultancy.

“I wanted some control over my career, and I didn’t want all these men in charge of it.” - Jaime

As can be seen from Jackie’s and Jaime’s quotes, both age and gender played a role in this strategy. The three quotes all have a core of being tired of the industry and how the participants were treated, which is a recurring trend with strategies relating to both age and gender. *Changing work environment* is re-occurring within the other subcategories and will be discussed more.

### Age related strategies

*Changing work environment* is also in *Age related strategies*. *Age related strategies* has 4 groups of strategies and 2 strategies without groups. The group with the most mentions is *Career related strategies* with 31, followed by *Changing appearance* and *Behaving younger* with 23 and 15 respectively. Lastly *changing work environment* is mentioned 6 times. All the *Age related strategies* can be seen in Figure 4.10.

The *Career related strategies* contains several strategies the participants have used to advance their careers. The codes can be seen in Table 4.9

Not unexpectedly, we also found the strategy to *keep teaching yourself (new) tech* as it was already mentioned by previous research [31]. Additionally, it is the strategy with the most code segments out of this list. Alex, Bobbie, Emery, Noah, and Stevie discussed the strategy. There are a few mentions regarding the difficulty of staying up to date with technology.

“I’ve been luckier than most. But yeah, I mean I’ve had to kill myself to stay on top of everything and stay on top of the newest technology” - Stevie

“I need to study harder to get up with what web can do to really assess that. ... That’s more because I [do not] have [a] development job anymore, so I think I’m missing out [on] that. But that’s more the not wanted to learn new stuff anymore.” - Bobbie

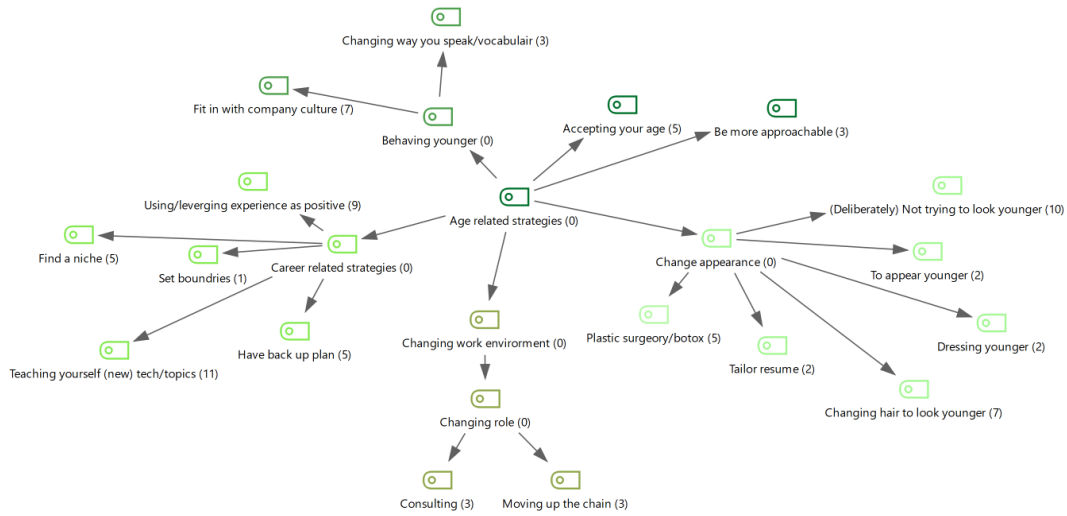


Figure 4.10: All codes pertaining to Age related strategy

Strategy	Short explanation	#code segments
Find a niche	Specializing in less common topics within the industry	5
Having a back up plan	Always being prepared to be able to get a different job	1
Set boundaries	Setting limits regarding what you would and would not do	1
Teaching yourself (new) tech	Continuously teaching yourself about (new) tech to keep up to date.	11
Using/leveraging experience.	Using ones experience as a career security and leveraging it as a reason to be listened to and respected.	9

Table 4.9: The strategies that are contained within the Career related subcategory in Age related strategies

Bobbie highlight that it becomes harder to keep up to date with the technology, even more so when one is no longer a developer. Additionally, there is also mention not wanting to learn new technology anymore. These mentions could be linked to a negative experience *Work has become less interesting* relating to age experiences, which will be discussed in a later section.

Alex used *Keep teaching yourself (new) tech* after they were told that they were not technical enough. This strategy had the benefit of feeling more confident after.

“But they said, oh, I wasn’t technical enough to do this or that, so I went on the web and just like, ... if they’re telling me this, let me brush up on system design, and so I did that. And the best part about it is when I was interviewing, my last year over at my previous job I’ve I felt a lot more confident.” - Alex

Additionally to *Keep teaching yourself (new) tech*, *Find a niche* can be strategy for older developers.

“I have become very specialized. Fortunately, I have found a niche, [in] which most programmers are older.” - Erin

Erin’s quote suggests that specific industries within software development might be more open for older developers. However, more important is that niche could help remain within an industry due to more job availability.

“This has to do with the fact that I have certain specialties that are hard to find.” - Billie

Billie suggests that there are specialties where there are not enough people. Billie works within web development/CMS (content management system), and they saw that more people are needed within certain specialties. However, Erin does not work within web development/CMS, and they made clear there is space for older developers. These statements show that finding a niche might be a helpful strategy for people in software development to adopt, such that they might continue a career when older.

Other strategies that some of the interviewees adopted are related to *behaving younger*, which can be viewed in Table 4.10.

Strategy	Short explanation	#code segments
Changing the way you speak/vocabulary	Continuously or unconsciously changing the way you speak to be more similar with younger people.	3
Fit in with company culture	Changing one’s behavior such that they fit within the youthful culture of the company.	7

Table 4.10: The strategies that are contained within the Behaving younger in Age related strategies

Most commonly mentioned is *Fit in with company culture*. This strategy relates to the youthful company culture without changing one’s appearance.

“I mean. It’s a world of young men. I’m not gonna fool anybody. I don’t want to be perceived as an old curmudgeon” - Stevie

However, not everyone is doing it to be perceived as younger but to fit in.

“Yeah, it’s also like in the culture of how a company works that you adopt that, and it’s not really because I want to be young, because we’re more like I want to fit in.” - Bobbie

This reason for fitting in was given by two out of the five participants who discussed the strategy. The two mentioning this reason were Bobbie and Sam. Stevie and Billie did mention wanting to come across as younger. The last interviewee did not specifically mention why they did this strategy but mentioned that this strategy might have been unconsciously adopted.

“Yeah, I, I mean part of it is that I think my behavior ends up changing over time just because of the people I’m working with too, like, I work with so many people who are younger than me” - Sam

Similarly to this quote from *Fit in with company culture*, *Changing the way you speak/vocabulary* is also seen as something someone picks up due to the culture they are in.

“I do tend to pick up. You know the colloquialisms, the slang, whatever. I learned to speak younger or in somewhat deliberately.” - Sam

“But that is more like how people work with each other in a working environment.” - Bobbie

Both the strategies *Fit in with company culture* and *Changing the way you speak/vocabulary* have links to the company culture but are not always directly related to the wish to appear younger. It just happens to be that the culture of their companies is youthful. *Changing appearance* are strategies related to changing appearance to look younger. Some of the strategies seen were also mentioned in the interview but stated the opposite of what was mentioned in the research of Baltes, Park, and Serebrenik (2020) [31]. Such as the ones seen in the strategies related to *Changing appearance*, which can be seen Table 4.11.

Strategy	Short explanation	#code segments
(Deliberately) Not trying to look younger	(Actively) trying to look you age	10
Changing hair to look younger	Changing the style or color of one’s hair to appear younger	7
Dressing younger	Changing the method of dressing to appear younger	2
Tailor resume	Altering ones resume to not clearly state one’s age	2
To appear younger	General methods to appear younger	2

Table 4.11: The strategies in Changing appearance in Age related strategies

Baltes, Park, and Serebrenik found the strategy of plastic surgery (2020) [31]. *Plastic surgery/Botox* was brought up by four participants. Billie and Jaime recognized the strategy and have seen other people use it.

“I don’t do this, but I know I have friends who have gotten Botox in order to look younger. Um, I think it’s fairly common.” - Jaime

Jaime highlights that people have done plastic surgery to appear younger, which is expected. However, they did not consider getting *plastic surgery or Botox*. Emery did consider plastic surgery an option if they planned to stay within the industry.

“If I continued to [work]. If I wanted to stay, I might do [plastic surgery/Botox]. ... To try and counteract bias.” - Emery

The reason Emery gave is to counteract biases older developers face. Specifically, Emery’s bias is the stereotype regarding Resistance to Change.

“That actually really does drive me crazy. When you’ve got someone. Just won’t learn the new tech because they just don’t want to. Just ’cause they’re lazy. ... I’m an older person, but I’m like not gonna continue to insist on using 15-year-old technology so, but I think there’s definitely that bias that if you’re older, that’s how you would be.” - Emery

They see this stereotype themselves and seem worried that others will think about them. Thus Emery would consider *plastic surgery or Botox* as a possibility to appear younger.

Jaime and Sam do try other strategies to appear younger such as *Changing hair to look younger* and *dressing younger*.

“I have noticed this around me. I have seen women dye their hair, they do.” - Alex

“A lot of women who dye their hair” - Emery

Both Emery and Alex have seen women around them dye their hair. However, it does not seem restricted to just women.

“I have seen many colleagues, male and female, both do this, so I have. ... One of them is a guy who’s a couple [of] years older than I am who is still working full time and he dyes his hair. He is fully white, but he has brown hair still, and he shaves his beard ‘cause otherwise, his beard would come in fully white and.” - Jackie

“Male colleagues, the guys there are like dying hair. Making beards grow, so nobody sees their double chin, you know stuff like that.” - Billie

It is important to mention that seven participants said they were young looking and thus did not struggle as much as others with the biases of looking older.

“I have never tried to make myself look younger, honestly. I’ve always been assumed to be quite young, so I have never felt the need to make myself seem yet younger,” - Riley

Possibly due to several interviewees being perceived as younger, we see more of these strategies being done by other people than our participants. Seven code segments are related to other people from the 14 code segments.

While some mentioned changing appearance specifically to look younger. Alex, Billie, Elliot, Emery, Jackie, Jaime, Sam, and Stevie mentioned seeing people try to look younger or do it themselves. However, six of the participants (*Deliberately*) *do not change their appearance*.

“I have those role models, and they don’t care about their appearance so much, so I try to.” - Stevie

“ You’ll notice I have Gray hair, and I am very proud of it.” - Jackie

Additionally, Dani, who is 60+, mentioned it was better to look elderly than middle-aged. This is in line with their previous quote.

“I deliberately don’t try to keep my appearance young. Because like. Honestly, I’m better off. Looking like I’m elderly than that, then looking like I’m middle-aged.” - Dani

These quotes clearly show that several participants did not try to look younger.

Another group where age related strategies were found was *Changing work Environment*. This group contains some of the same strategies already mentioned earlier, as can be seen as Table 4.12.

Strategy	Short explanation	#code segments
Changing roles	(1) Going into <i>consulting</i> instead of being employed by a company.	(1) 3
	(2) <i>Moving up the chain</i> of command i.e to senior developer	(2) 3

Table 4.12: The Age strategies that are contained within the Changing work environment

Alex makes an important statement concerning *Moving up the chain*.



“When I was midway through my career, I was seeing younger people coming in, which is fine. I wasn’t that old, but ... there’s always going to be younger [people], and they come in with new programming languages and new tools, which means I would have to learn all this stuff all over again. And so I got to a point where. I don’t wanna do this anymore. I don’t think the problems are with the technology. It’s just changing technology. But it’s the same thing over and over again, and I just saw that there were young people coming in, and I said, ‘If I stay as an individual contributor, I think I only have more problems down the line getting the salary and the positions that I want.’ ” - Alex

In the quote, we see several returning concepts, such as not wanting to keep learning new technology. Additionally, Alex highlights how it would become hard to remain an individual contributor.

Two strategies are outside of any subgroup in *Age related strategies*, which can be seen in Table 4.13.

Strategy	Short explanation	#code segments
Accepting your age	Not trying to appear or act younger than one is.	5
Be more approachable	Give other people their moment and being easy to talk to	3

Table 4.13: Age related strategies without subgroup

## Gender related strategies

*Gender related strategies* is the biggest of the strategy related group, with 8 separate subgroups and 308 code segments. The 8 are *Against gender bias strategies*, *Career related strategies*, *Changing work environment*, *Changing your appearance*, *Communication methods*, *Ignoring situations*, *Traditionally Feminine*, and *Traditionally Masculine*. There are also four codes without a subgroup. This can all be seen in Figure 4.11.

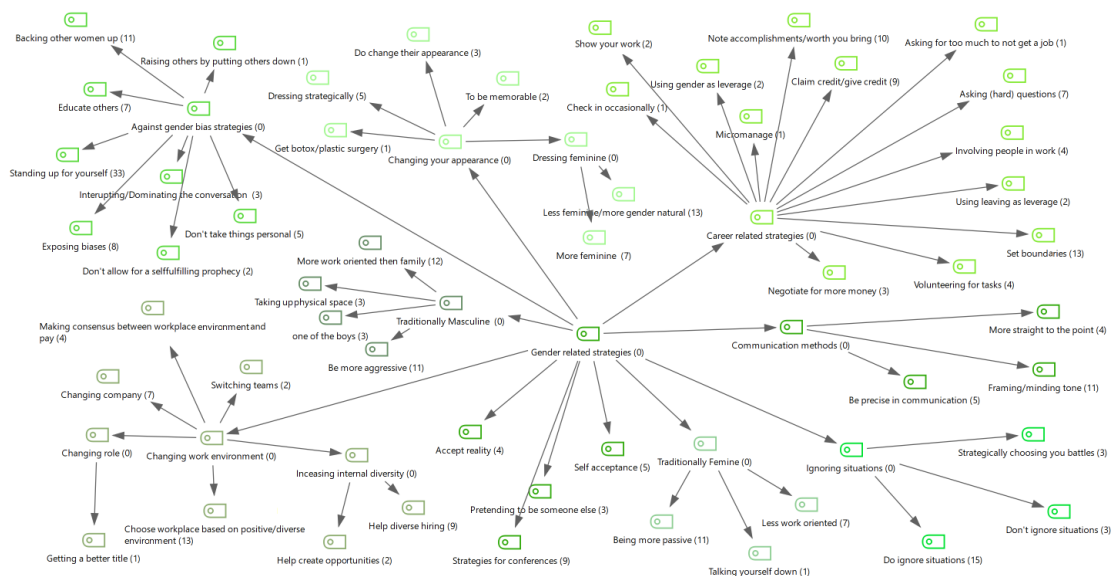


Figure 4.11: All codes pertaining to Gender related strategy

*Against gender bias strategies* is the biggest subgroup with 70 code segments and 8 strategies which can be seen Table 4.14.

Strategies	Short explanation	#code segments
Backing other women up	Be supportive of other women in the industry.	11
Do not allow for a self-fulfilling prophecy	To not go into something assuming one's gender will negatively effect a situation	2
Do not take things personal	to not take comments or behaviours others make personally.	5
Educate others	Teaching others about the gender bias	7
Exposing biases	Exposing when someone say or does something in accordance of the gender bias	8
Interrupting/Dominating the conversation	Either interrupt a conversation or dominate a conversation (with others) to make your voice heard.	3
Raising others by putting others down	Getting ahead by putting others down	1
Standing up for yourself	Defend yourself in a situating	33

Table 4.14: Gender related strategies in Against gender bias strategy

*Standing up for yourself* is most commonly mentioned with 33 code segments by nine different people. Bobbie and Elliot mentioned that it is important to stand up for yourself.

“You need to stand up for yourself because men are different. Generally, in my experience, if you don’t stand up to men, they’re gonna squash you. If you stand up to them, even if they think you’re Bitch. They’re gonna respect you more.” - Elliot

Elliot highlights the issue of not being respected, and to solve that, Elliot stood up for themselves. Multiple participants gave stories, including Elliot, about standing up against sexism.

“When I was in my first five years, there [were] a lot of people basically saying, ‘Oh you would be so much more successful if you, so, you know, grew your hair out. If you wore a skirt’. ... I was like, ‘What the f\*ck are you saying?’ You know, but it was a real thing.” - Elliot

While Jackie, Sam, and Jamie mentioned that they had always been outspoken or “in your face”. Not every one of the participants has been, and they mentioned having to learn to stand up for themselves, such as Bobbie and Alex.

“I had to fight to get to that director level by telling my manager you should be promoting me because XY&Z” - Alex

While *Standing up for yourself* is used when people are sexist, it is also used in getting a pay rise or a promotion.

“I’ve done [it] once with pay, but I took the statistics from the Union, went into my boss and said I’m getting women pay. I won’t accept that. I have not been on leave. I don’t have any of the other stupid excuses you use for not paying women. I want a proper pay. And then I got ... €800 month” - Robin

A similar strategy in this subcategory is *Exposing bias* as it also confronts sexism.

“And we are actively working against it is if somebody comes with a sexual remark. We had an anonymous sexual remark, it wasn’t a big thing, but it was like ‘nice ass Jen’ at one of our meetings. Um, I brought it up at the next meeting for the whole company and said, ‘this is not acceptable. So we are. I am also in a company where we strike down on these immediately.” - Sam

Sam also shares in this quote that the company culture is important as it allows someone to speak up. However, the importance of company culture will be discussed when we look into the participants’ experiences.

*Standing up for yourself* is also closely linked to related strategies such as *Interrupting/Dominating the conversation* and *Backing other women up*.

*Backing other women up* is rooted in helping each other.

“I’m on the lookout for other women too. ... Like I’m very much on the lookout for the thing of like someone tries to steal another colleague’s idea. And I’m like, ‘she just said that that’s exactly what, you know, Carol just said’. I just don’t let people get away with it.” - Emery

Emery gives the example of *backing other women up* by giving credit to other women, which is a method to back other women up done by more interviewees.

“Like if let’s say, John is speaking over and stealing Sara’s idea, I will say, ‘oh, John, I love how you rephrased what Sara just said.’ ” - Robin

Notably is how Robin approach this situation compared to Emery. Their communication styles are opposite. While Emery outright says what is going on, Robin phrases it more delicately. These are two of the three communication styles we have seen brought up during the interviews. *Communication methods* contains:

Strategy	Short explanation	#code segments
Be precise in communication	Make precise statement and do not allow space for uncertainty.	5
Framing/minding tone	Using more gentle method to phrase something.	5
More straight to the point	Directly state how things are and not beating around the bush	4

Table 4.15: Communication methods in gender strategies

Interestingly, Sam mentioned that they used to be more gentle but now are more direct.

“I don’t phrase things as gently as I used to at all, and I am much more upfront.” - Sam

There is no clear indication of which one of the two is better. However, more mention *Framing/minding tone*, so this might be more commonly done, but that does not mean *More straight to the point* is a less valid strategy. The third *Communication method*, *Be precise in communication* is mentioned by one person, but the reason for their communication method is interesting.

“So I’ve learned to be very very precise in my communication as much so as possible, so I don’t. For example, I don’t say, ‘I’m pretty sure about something else’. I say ‘I’m 60% sure that this is correct or I’m 90% sure that this is correct’, because being more precise; is people won’t give me the benefit of the doubt” - Riley

Thus this might be a strategy that directly challenges the perception of women being less

capable.

The quotes by Emery and Robin relating to giving credit also contains examples of the strategy *Claim credit/Give credit*, which is a part of *Career related strategies*. All the strategies contain within *Career related strategies* can be seen in table 4.16.

Strategy	Short explanation	#code segments
Asking (hard) questions	Asking possibly difficult questions to advance one's career or at the company.	7
Asking for too much to not get a job	Asking too much money for a specific job so that the participant gets turned down.	1
Check in occasionally	Checking in with colleagues occasionally.	1
Claim credit/give credit	Insuring that the right person gets the credit.	9
Involving people in work	To involve other people in a particular work task.	4
Micromanage	Carefully observing what is happening at all times.	1
Negotiate for more money	To involve other people in a particular work task	3
Note accomplishments /worth you bring	Writing down, or being aware of one's own accomplishment or the worth brought to a company.	10
Set boundaries	Setting limits regarding what someone would and would not do.	13
Show your work	Showing someone else the steps performed to achieve something	2
Using gender as leverage	Using one's gender to get something done or make a point	2
Using leaving as leverage	Using leaving a company to advance a career.	2
Volunteering for tasks	Taking initiative when task assignment is happening.	2

Table 4.16: Career related strategies in Gender related strategies

*Set boundaries*, *Note accomplishment/worth* and *Claim credit/give credit* are most commonly mentioned with 13, 10, and 9 respectively.

*Set boundaries* is also a strategy mentioned in *Career related* in *Age related strategies*. The *Set boundaries* in *Gender related strategies* are used in situations related to Gender, but the core of the strategy is the same.

“I definitely sometimes [am] more work oriented than family orientated, but ... I work really hard in the week and then the weekend is very protected I try to be really conscious of my behavior there.” - Charlie

Charlie set boundaries for when they will work and not. Another boundary Charlie mentioned is whom they will and will not help.

“I have learned how to do two things about that. One is to pull back and say. ‘Does this person need my help specifically? And do I need to be doing this’ ... The second, thing is I drew this concentric circle which was like the middle core, the outer ring, the outer ring, and the outer ring. And I specifically decided that the middle one is my family ... and then the outer ring is like black people and women ... economically disadvantaged people. ... And then only do you get to the very outer ring is it white men” - Charlie

Here, Charlie clearly shows that they decided to put more effort into helping marginalized people and no longer help everyone who asks. However, more interviewees discussed helping marginalized people, not just women.

The second most commonly mentioned *Note accomplishment/worth*, was mentioned by four people.

“I document. I document what I’ve accomplished, what the impact is. I don’t leave it just to my manager to do those things.” - Noah

Noah also mentions the reason why they stated to use this strategy.

“I went to a company that was bigger, about 50 people. So there was more of an opportunity for that. ... Just not a good management situation. So that’s when I really started [documenting] things because I realized that. If nobody is communicating, like if things are always going sideways because nobody is communicating, then you could do a lot [by] just by asking everybody what are you doing that impacts this project and getting them all in a room together.” - Noah

Additionally, they mentioned the benefits and disadvantaged they noticed from this strategy.

“[Documenting] made what I was doing more rewarding and made me feel like I was having a bigger impact. It helped me discover some of my strengths when it comes to that. ... People like working with me. I get good referrals.” - Noah

“Unfortunately, when your manager isn’t doing his job and you sort of, do some of his job for him. Doesn’t make you friends with the manager” - Noah

Charlie also mentions a reason and benefit to noting one’s accomplishments.

“I keep a list of accomplishments, and so like if I feel like people don’t value my work, I can just go back and read my list of accomplishments, and it’s like wow, you’re just you’re doing it, lot you’ve done a lot like take a rest.” - Charlie

It suggests that *Note accomplishment/worth* can help build confidence, which women sometimes struggle with [72]. Thus it could help other people who struggle with confidence issues.

Lastly, *Claim credit/Give credit* is connected to the experiences that ideas were stolen from women. Three of the participants mentioned *Claim credit/Give credit*. Emery also clarifies why it is important to get credit for an idea.

“I went to a women in tech talk once and. There were younger women on the panel, and they were in sales, and they were saying ‘Oh yeah, my colleagues. They steal my idea, ... but it’s OK because at the end of the day we all split the commission’. And I’m like, ‘no, that’s not true. You are wrong!’ Because, what has happened is that the end of the day, he’s getting the promotion for stealing your idea, or he’s getting the promotion because it seems like he has the better client relationship.” - Emery

Emery highlights the issue of getting one’s ideas stolen. This can affect promotion opportunities. Earlier quotes from Robin and Emery already show how to tackle this issue. These examples show what one could say if one get their idea stolen.

What the saleswoman said during the conference mentioned by Emery seems like she is ignoring the situation, which is a strategy seen before within IT [39]. *Ignoring situations* was a strategy

asked about in the interviews and if the participant recognized it or used this strategy. The results relating to these findings are in Table 4.17.

Strategy	Short explanation	#code segments
Do Ignore situations	Ignoring situations commonly referring to sexist or discriminatory situations	15
Do not ignore situations	Addressing the (discriminatory) situations	3
Strategically choosing your battles	Per situation deciding if its worth fighting or nor	3

Table 4.17: Ignoring situations in Gender related strategies

Ten of the 14 participants mentioned that they *Do ignore situations* or seen people do it. It is mentioned by Bobbie, Dani, Elliot, Emery, Jackie, Jaime, Riley, Sam, and Stevie.

“Ignoring situations, sometimes, yes” - Dani

“Yeah, I think everybody has to adopt some amount of being willing to ignore something.”  
- Riley

“So I can see ignoring situations. I certainly did that when I was younger. Now that I have some power, I don’t.” - Jaime

Jaime *does not ignore situations* and they only stopped *ignoring situations* once they gained power. Jaime did use to ignore situations when they were younger. They also mention a reason why women *do ignore situations*.

“Ignoring situations is a survival technique. Women don’t gain much from challenging sexism. Especially if the men in the room don’t experience it. ... . And it’s very hard for women to push back.” - Jaime

There is a reason repeatedly mentioned by several people why ignoring situations does not work.

“The women who are trying to fight every fight don’t last. They burn themselves out. I’ve experienced that as well.” - Riley

This is why *Strategically choosing your battles* might be a better option. Billie chose to take another option when they were a part of a toxic work environment: leave the company. Similarly, as before *Changing work environment* is also seen in relation to gender. All the *Changing work environment* strategies can be seen in Table 4.18.

Some have left companies because of gender related reasons, such as Billie, Jackie, and Elliot.

“ ‘No, if you keep me on [the old tech] for more for another month and you don’t give me the new stuff, I’m gonna go look for another job’. So and I did right ’cause he could not. He could not see past his own prejudices.” - Jackie

Not just jobs were left, but also open-source projects were left behind due to sexism.

“I did leave an open-source project once because of the sexism going on there.” - Billie

Strategy	Short explanation	#code segments
Changing company	Moving to a different company then you worked for before	7
Changing role	By <i>Getting a better title</i> but not necessarily a better pay	1
Choose workplace based on positive/diverse environment	Let the positive/diverse environment play a role in the decision to work for a company	13
Increasing internal diversity	(1) by <i>Helping create opportunities</i> (2) by <i>Helping diverse hiring</i>	(1) 2 (2) 9
Making consensus between workplace environment and pay	Choosing either a positive workplace environment over a good pay or vice versa.	4
Switching teams	Staying within a company but switching the development team one works in.	2

Table 4.18: Changing work environment in Gender related strategies

Interestingly, Billie, Charlie, Jaime, Riley, Robin, and Sam mentioned paying attention to the work environment when picking a job.

“I specifically when last time it was looking for a job. I was looking for an environment that I would want to work.” - Sam

“The reason I took this job and one of the reasons was I was like for the first time I can help a company keep the culture instead of trying to go in and fix it later because that’s what I’ve been doing for years.” - Robin

Not only is a positive work environment important, but some are also willing to be paid less to get this environment.

“Finding in a place like that, though, did mean that I had to give up. I’m getting paid significantly less than I could be getting paid. I could be working in the AAA game development industry for considerably more money.” - Sam

Sam shows that sometimes *Making consensus between workplace environment and pay* is preferred then working in a bad environment.

Several of the women also work to make their current place of work more diverse by *Help create opportunities* or *Help diverse hiring*.

“We’re trying to get opportunities for people to work. So we’ve hired more female-presenting engineers and some of our goals to get, me to actually be there lead on projects because it’s extremely rare to actually have,” - Sam

This *Help diverse hiring* does not only mean in terms of gender.

“They don’t know how to go about recruiting people from other backgrounds. They don’t know if their processes are biased, you know, on and on, and so I’ve played a big part in previous companies around those areas.” - Alex

“I was talking to a large company recently. I was like, ‘dude, you know. There aren’t gonna be 2000 white male devs for you to hire. You know you might need to think about hiring some non-white male’.” - Elliot

Thus *Changing work environment* to some is not just finding a good place for themselves to work, but also making it better for others.

The last two subgroups in *Gender related strategies* not yet discussed are *Traditionally Feminine* and *Traditionally Masculine* based stereotypes. The subgroups’ strategies can be seen in Table 4.19 and Table 4.20 respectively.

Strategy	Short explanation	#code segments
Being more passive	Being more passive in the workplace, for instance not speaking up when in groups.	11
Less work oriented	Work is considered secondary	7
Talking yourself down	Putting yourself or your skills down to make a point	1

Table 4.19: Traditionally Feminine in Gender related strategies

Strategy	Short explanation	#code segments
Being more aggressive	Behaving determinedly and/or forcefully. This does not include being physically aggressive	11
More work oriented then family	Being more focused on work than on family, by, i.e., working overtime instead of being with family	12
Taking up physical space	Make your body take up more space instead of making yourself small.	3
One of the boys	Being accepted by part of a group of men	3

Table 4.20: Traditionally Masculine in Gender related strategies

*Being more passive* has been seen by literature [39], and thus was asked about directly during a part of the interview. Six people mentioned being more passive or saw others be more passive. Alex, Bobbie, Charlie, Dani, Elliot, Emery, Riley, and Robin were the people mentioning it.

“I definitely noticed other women being more passive [in] groups.” - Emery

“[I was] being more passive in groups that was maybe used to be the case but not anymore. I’m fairly shy by nature, so maybe like 15 years ago I would do that, but not anymore.” - Bobbie

Bobbie states what other women also mention. They learned to be less passive over time. Two other participants mentioned being more passive earlier in their careers. Additionally, out of the eight people who discussed *being more passive* six mentioned seeing others be more passive and not doing it themselves. Emery mentions possible reasons why people are more passive.

“I mean when you are passive, you don’t get made a target. That is definitely the reason that a lot of people choose that path.” - Emery



While not being made a target might be a good reason to be more passive. There are also disadvantages mentioned.

“I have had things that, I explicitly don’t do because I see a lot of my female colleagues doing, especially like being more passive and groups. I’ve noticed a lot of female colleagues doing that, and I refused to engage in it because I see that it doesn’t. It leads to bad trajectories for them.” - Riley

Thus Riley gives a reason why not to use this strategy. Thus we could look at the strategy opposite of *Being more passive*, *Being more aggressive*. *Being more aggressive* was mentioned by Alex, Billie, Dani, Elliot, and Riley. Elliot is among those who might be considered more aggressive.

“Maybe you don’t have to be as aggressive as I am, but I don’t think it helps you either because if guys don’t respect you, if they don’t fear you a little bit, they’re not gonna treat you that well anyway.” - Elliot

Elliot also mentioned why to them, *Being more aggressive* does not hurt.

“Being as big a bitch as you want. Because the only way that most people are gonna get ... more money here is by leaving. And so if you already know that you should be leaving your job every 18 months or something. Why won’t you just, have that be your strategy?” - Elliot

However, Billie sees disadvantages regarding the strategy.

“Generally, women in high positions, are doing exactly that. They’re being nastier there being harder, they’re being. ... What I feel about a lot of them is that. They were trying to stay upright in a storm that was only in their head. And I have seen this with women in positions of power. ... These are the women unconsciously allow men to maintain the glass ceiling. Yeah, it’s like in a company when everybody is doing overtime without writing the hours. The management won’t know where they think everything has to be like that.” - Billie

Thus it is not clear if either *Being more passive* or *Being more aggressive* is a good strategy. The strategy a person might choose could depend on the environment or a person’s personality. Bobbie did suggest that personality played a role, but not all. While none of the interviewees mention it, a strategy between passive and aggressive might work better for some people.

Another two strategies that are opposite of each other are *Less work oriented* and *More work oriented than family*.

“Being more work related, then female- then family-oriented? No family always comes first.” - Bobbie

Four different people discussed *less work oriented* either in regards to themselves or others.

“Being more work oriented than family oriented, definitely. ... So I’ve noticed myself and others doing that when I was younger.” - Emery

This quote suggests that earlier in their career, women were more career oriented but switched to being less work oriented. Other participants see this too.

“Being more work oriented than family orientated, there’s just like a lot of times I thought like if I just work harder to accomplish more.” - Charlie

In total, four participants out of nine used to be *More work oriented*, but it changed over time.

Charlie also highlights why they did this strategy to accomplish more. This could be related to the need to prove yourself, which was seen by the literature [38,40].

There are other reasons why a woman, or person, might be more work oriented. Dani highlights an important one.

“Being more work oriented than family oriented. Frankly, that’s easier if you’re trans because.” - Dani

The context that Dani, who is trans, gives is that trans people do not always have a supportive family who might not be in their life. Thus it is easier to be more work oriented. People, who are not trans, might also be related to this quote if they do not have a family.

Besides, why some women are *more work oriented* Riley discusses a negative.

“I’ve known someone who did that, I don’t. I don’t have the energy for that even before I had kids, I have other things to do, but I’ve seen women doing that. So I personally find that deeply unhealthy, whether male or female.” - Riley

Another strategy that Noah, Riley, and Robin discussed is to be *one of the boys*.

“I used to present myself in a very traditionally male way. And you know, I adopted a number of traditionally male hobbies and things that I enjoyed in a way of speaking, um to, to mask into to help myself fit in better. Here, um. I do a lot less of that now, but after probably a decade, that was my primary coping mechanism was to make myself closer to my male colleagues and then try to then minimize the bias, because, ‘oh, you know, I’m one. It would just do another one of the guys just like them’. I found that it in practice, it wasn’t. It probably wasn’t that effective, even though it felt like I was doing something.” - Riley

Riley highlights why they did the strategy; to reduce the bias and felt like it was ineffective. There is also a part to this strategy about appearance.

“I’m showing up in jeans and a T-shirt, and I’m wearing the exact same thing that all the guys are. Because, you know, at that time I was trying to just really be one of them...” - Noah

Another strategy closely related to *Changing your appearance*, which all strategies related to this can be seen in Table 4.21.

Strategy	Short explanation	#code segments
Do change their appearance	They do change their	3
Dressing feminine	(1) Either dressing <i>less feminine</i> / <i>more gender neutral</i> (2) Or dressing <i>more feminine</i>	(1) 13 (2) 7
Dressing strategically	Deciding how to dressed based on the situation you are in.	5
Getting Botox/plastic surgery	Getting Botox/plastic surgery to change your appearance based on gender related reasons.	3
To be memorable	Dressing to stand out and to be memorable	2

Table 4.21: Changing appearance in Gender related strategies

We observed the strategy *less feminine/more gender neutral*, which Noah already mentions

they were doing. Nevertheless, there are another thirteen mentioned by Alex, Charlie, Dani, Jackie, Noah, Riley, Robin, Sam, and Stevie. There are more statements similar to Noah.

“I have adopted dressing up in a more masculine way, like I’ll wear jeans and jackets and stuff, but I let go of that.” Alex

Alex also mentioned they stopped doing this strategy, which Sam and Noah also mentioned doing.

On the other hand, we see dressing *More feminine* mentioned by Alex, Billie, Elliot, Emery, Robin Sam, and Stevie. Sam and Alex mentioned starting to dress *More feminine* later in their career.

“[I] used to not wear dresses a lot at all. Or even dress all that femininely. ... I’m known as the woman that comes in when the dress on in the summertime and everybody is asking what’s that dress about? And I’m just like ‘I just want to wear dress’. I don’t care. And so yeah, I’ve seen that I’ve adopted that, but I’ve now not even bother with it.” - Sam

*Get Botox/plastic surgery* has already been mentioned concerning age, but it also came up concerning gender.

“I’ve also has have a friend who gets Botox so that she doesn’t look angry on video calls.” - Jaime

The reason why Jaime’s friend got Botox could be related to the sexist beliefs of what a woman should and should not be [73].

Jaime and Riley change their appearance to be more memorable so that possibly others will remember them better.

“I don’t really look at it like it now, but I have a wardrobe full of designer stuff that’s a little different. So I also enjoy clothes. I have short hair, which doesn’t seem very radical, but you know it’s different in this city, which is fairly conservative. Most women have long hair. I stick out in a crowd anyway, ’cause I’m tall and a pale and I don’t look quite like everybody else, so I use it. If I’m going to be not the default, I’m going to live up to it. I’ll be very recognizable” - Jaime

Additionally, Charlie, Emery, Noah, Robin, and Sam mentioned *Dress strategically*.

“... when I was in a role whereas client often doing pitches to clients like to buy our games and stuff. I think I would dress more, masculine so that I could be, I am the tech person.” - Sam

Sam shows that sometimes *Dressing strategically* might be needed to be taken seriously. Several participants mentioned not being taken seriously, which will be discussed when answering the second research question.

There were also cases where women *Dress strategically* dress to avoid negative behavior from others.

“I know I have female friends, women friends who will never speak at a conference in a short dress or showing your cleavage. Because they will get a harassed because they look good.” - Robin

That there is a need for strategies to stop harassment is alarming because there is a need for them in a professional space. However, there are *Strategies for conferences* that are in place to

stop the harassment.

“In the groups I’m in that are sort of, for marginalized gender identities and things, we have to talk a lot about like, OK, you’re going to a networking event: Make sure to keep an eye on if you drink. Don’t let the drink be open. Don’t eat any of the food” - Sam

Sam highlights several strategies that people of marginalized genders feel a need to do at conferences to keep themselves safe, which is alarming.

*Strategies for conferences* is not in a subgroup of strategies, with three others, which can be seen Table 4.22.

Strategy	Short explanation	#code segments
Accept reality	Accept that the situations is the way it is	4
Pretending to be someone else	Not behaving, dressing, like yourself to try and fit in	3
3 Self acceptance	Not trying to hide who you are	5
Strategies for conference	Strategies done at conferences	9

Table 4.22: Strategies without subgroups in Gender related strategies

All these strategies show several techniques women have adopted in software development. Lastly, we look at general strategies.

### General strategies

*General strategies* is the smallest group of all the strategies related to code groups. Additionally, *General strategies* mostly contains codes already in the other groups. However, the mentions of strategies could not be linked to age or gender. This can be seen in Figure 4.12

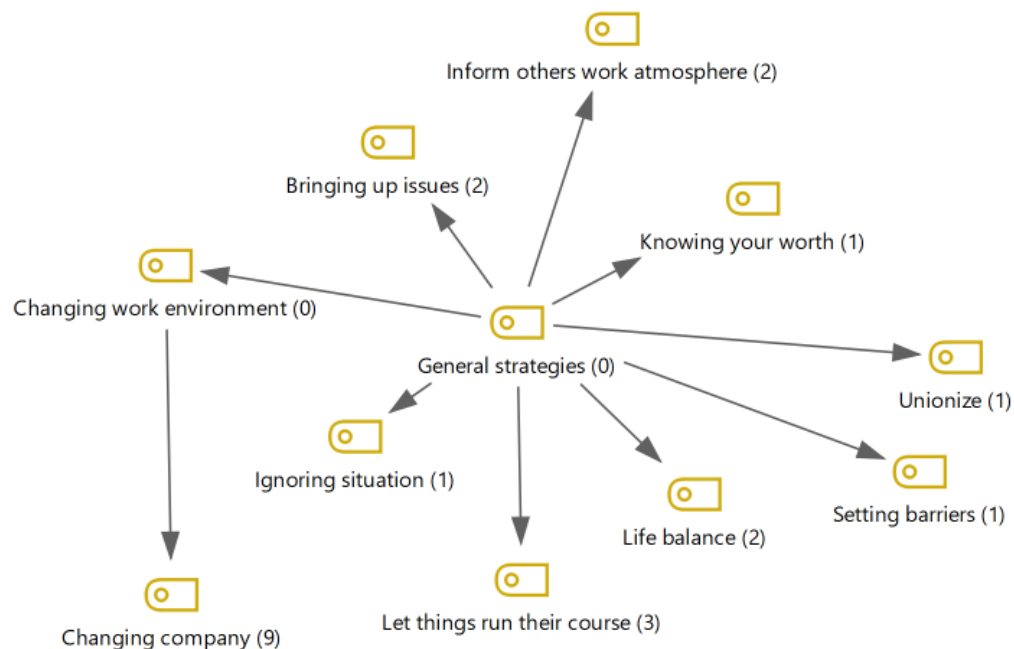


Figure 4.12: All codes pertaining to General strategies

All codes can be seen in Table 4.23.

Strategy	Short explanation	#code segments
Bringing up issues	Speaking up when they see problems in a company/industry	2
Changing work environment	By <i>changing company</i>	9
Ignoring situations	Ignoring situations commonly referring to sexist or discriminatory situations	1
Informing others of work atmosphere	Spreading the word about a negatives work atmosphere a company has	2
Knowing your worth	Being aware of the value you bring to a company, job or yourself	1
Letting things run their course	Allowing situations to continue without interfering	3
Life balance	Balancing once career and life	2
Setting barriers	Setting limits regarding what you would and would not do	1
Unionize	Creating a union	1

Table 4.23: General strategies

As most of these codes are already discussed earlier, we will only discuss the new ones.

*Bringing up issues* is related to when the participants bring up issues they see, for instance:

“I was consulting at a company where the CEO was saying one thing, and all of his body language was saying something else. And so I decided to have a conversation with him about this. Knowing that he might fire me. As a consultant, but I made the evaluation that this was important enough and if he fired me, I couldn’t help the company anyway.” - Robin

Robin was willing to bring up an issue relating to body language, regardless of the fallout. While confronting others about issues can be used for gender and/or age issues, in the cases mentioned, it was not.

*Informing others of workplace atmosphere* can be when someone informs someone else about a company’s bad or toxic workplace. This company can be their current company or previous company.

“I don’t know this is one of those awkward situations where then you see other people starting to work within it and you’re like, do I tell them? No.” - Sam

Sam decided, in this case, not to tell someone, but it is still a technique that can be done. While sexism and ageism can be examples of toxicity in a workplace, it does not have to be.

*Let things run their course* is when the participant decides to not do anything about a situation but just sees what happens. Sam mentioned they might have acted if they had known the outcome.

“I worked there for quite a while actually. ... In the end, though, we ran out of money. So they couldn’t pay me, so I just didn’t work there anymore. ... I might have just left sooner. But I did really care about the things we aren’t making.” - Sam

*Life balance* is similar to *less work oriented*. It is about balancing one’s life and work.

“Only working 40 hours. We don’t like the word work life balance. We like life balance. Because it shouldn’t be that you have to choose. It should be so that you have space above.” - Robin

Robin points out the importance of having a life besides just work.

“I also see a lot of movement towards unions, which I like. I think that’s a good thing. I think we need to force that. Obviously, I will never be in a Union ’cause I’m a manager, ... but I think it’s healthy. And I think that would do a lot toward rationalizing salaries.” - Jaime

Jaime discusses *Unionize*, which is a strategy for the industry, to *Unionize* the workers. And thus not directly a strategy a person can do. However, a person could join a movement toward creating a union.

We have seen all the strategies in *Age and/or gender related strategies*, *Age related strategies*, *Gender related strategies* and *General strategies*. All the strategies in these categories could be used to survive the industry, and the participants all used several of them throughout their careers. Sometimes with less positive results and sometimes with more positive results. There is no simple list of strategies that ensure a long career in software engineering. Nevertheless, many of the strategies mentioned were perceived to be useful and thus could help someone sustain a career in the industry.

### 4.3.2 RQ2: What are of the experiences relating to gender and age have women in software engineering encountered?

There are 72 codes relating to experiences, and these are categorized into four main categories. *Age and/or Gender based experiences*, *Age based experiences*, *Gender based experiences* and *General experiences*. These can be seen in Figure 4.8 in the blue section. However, we will also highlight these categories as we discuss them. We will discuss them one by one starting with *Age and/or Gender based experiences*.

**Age and/or Gender based experiences** The codes related to *Age and/or Gender based experiences* can be viewed in Figure 4.13.

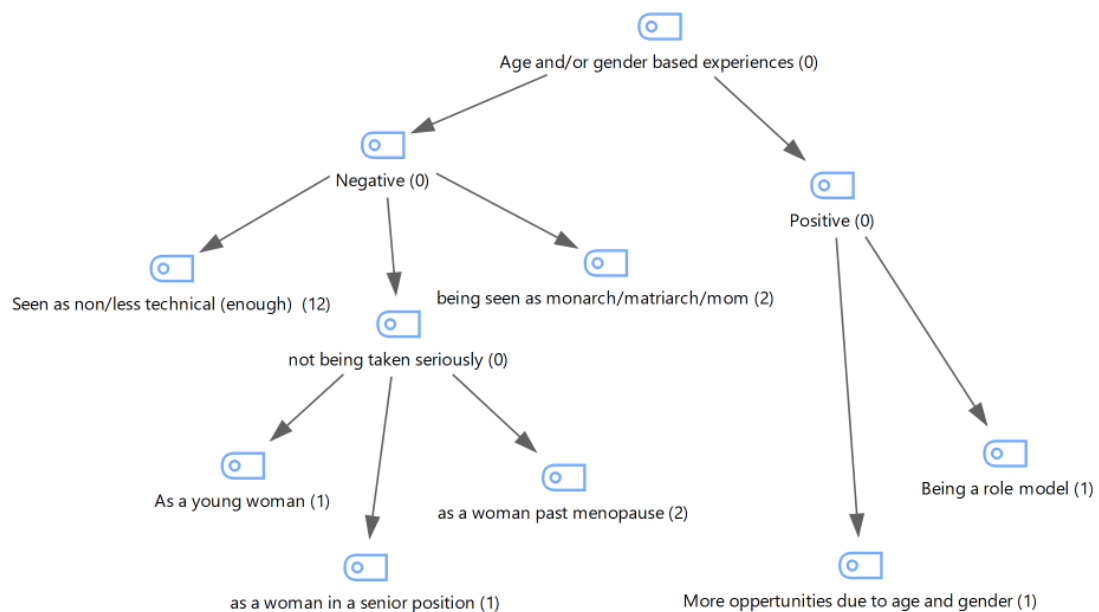


Figure 4.13: All codes including the Age and/or Gender based experiences

The *Age and/or Gender based experiences* are split up into positive and negative experiences.

First, we will discuss the positives which can be seen in Table 4.24.

Code	Short explanation	#code segments
Being a role model	The opportunity to be a role model to someone	1
More opportunities due to age and gender	The increase of opportunities resulting from their gender and age	1

Table 4.24: Positive experiences in Age and/or Gender based experiences

There are not many positive experiences mentioned related to age and gender. The two positive experiences mentioned are *Being a role model* and *More opportunities due to gender and age*.

Elliot mentioned positive experiences related to *More opportunities due to gender and age*.

“Now. It’s interesting because the gender and age has combined because the actual businesses are more oriented towards older women. And, um. I did not expect that. But because there’s so few older woman. ” - Elliot

Elliot sees the industry becoming more interested in older women due to the limited amounts of older women in the program. They tell a specific story highlighting the interest.

“A company approached me and said they were in the business, they wanted to make an app that would help predict who would have a stroke. ... They were like our ideal candidate would be a woman of color [has experience] And also has survived a stroke.” - Elliot

This is not the only time a company reached out to Elliot, looking for older women and older women of color. For context, Elliot is one of the participants who specified their race during the interview.

Sam had positive experiences related to *Be a role model*.

“Hoping to encourage that through the class, both in my technique of teaching and then also just being there, being like, ‘hey look, I’m an old, an old mom and I’m teaching your class and I’ve been in this industry for this long’.” - Sam

Sam was teaching a course and educational institute, which they do to be a part of intuitive to help increase diversity within her specific industry.

There are also negative experiences related to *Age and/or Gender based experiences*, these can be viewed in Table 4.25.

*Seen as non/less technical* is mentioned 12 times by 8 different people. Two examples of being *Seen as non/less technical*. The large number of people having experiences related to being *Seen as non/less technical* was also noted in the literature [38,40]

”Sometimes when meeting people that are not in a technical role and. Yeah, I mean I’ve been a director of game programming and at the senior software engineer and I still get people who are trying to like talked to me thinking that I won’t understand technical concepts.” - Sam

“I get, you know what conferences and stuff I get the ‘are you so and so’s girlfriend’ or ‘you so and so’s wife?’ Even “are you even artists?” And I am like ‘No’,” - Sam

Sam highlights two sides of being *Seen as non/less technical*. On the one hand, we see that even if one is in a higher technical position, people still talk to women as if they do not understand.

Code	Short explanation	#code segments
Seen as non/less technical (enough)	Experiences related to being perceived as not or less technical.	12
being seen as monarch/matriarch/mom	Experiences related to being called a monarch, matriarch or mother or people behaving as such	2
Not being taken seriously	(1) not being taken seriously because of being <i>a young women</i> . (2) not being taken seriously because of being <i>a women in a senior position</i> . (3) not being taken seriously because of being <i>a women past menopause</i> .	(1) 1 (2) 1 (3) 2

Table 4.25: Negative experiences in Age and/or Gender based experiences

On the other hand, we see that people assume that women cannot be in a technical role; thus, there must be another reason they are there.

There are code intersections between some of the mentioned regarding *Seen as non/less technical* and *sexism*. *Sexism* will be discussed in the *gender based experiences*.

Closely related to being *Seen as non/less technical* is *not being taken seriously*. From the experiences or opinions of the participants, we see that it can happen several times during a women's career. First, as a young woman:

“felt I was discounted 'cause I felt like people thought I was young.” - Charlie

Next, it can happen when a woman is at a senior level.

“It's OK for a woman to be around you if she is your junior and you can tell her what to do, and she is just there to help. But if she is in charge and if she might tell you that you are wrong, then that is a real problem.” - Emery

Lastly, women might not be taken seriously after menopause.

“I felt it happened in the last three years where literally as I approached menopause, there was another shift of just this contempt, because you're not even a sexually available female. And there's no, 'I don't even have an interest in and having sex with you and so why would I ever listen to you? You're going to try and tell me I'm wrong and you're unattractive' so it got even worse. And of course, this is all individual, but I definitely sensed some things.” - Emery

These examples suggest that women might face ageism at multiple stages during their careers when they are 'too young' and 'too old'. However, regardless of the age, it seems like women might never be taken seriously by some.

### Age based experiences

The experiences noted by the participants that are age related can be seen in Figure 4.14.

Again, the experiences are split into negative and positive. The codes segment in the code for *positive* and *negative* are general mention of age being positive or negative respectively. We will again start at positive.

*Wanted by company* is similar to *more opportunities due to age and gender* discussed before.



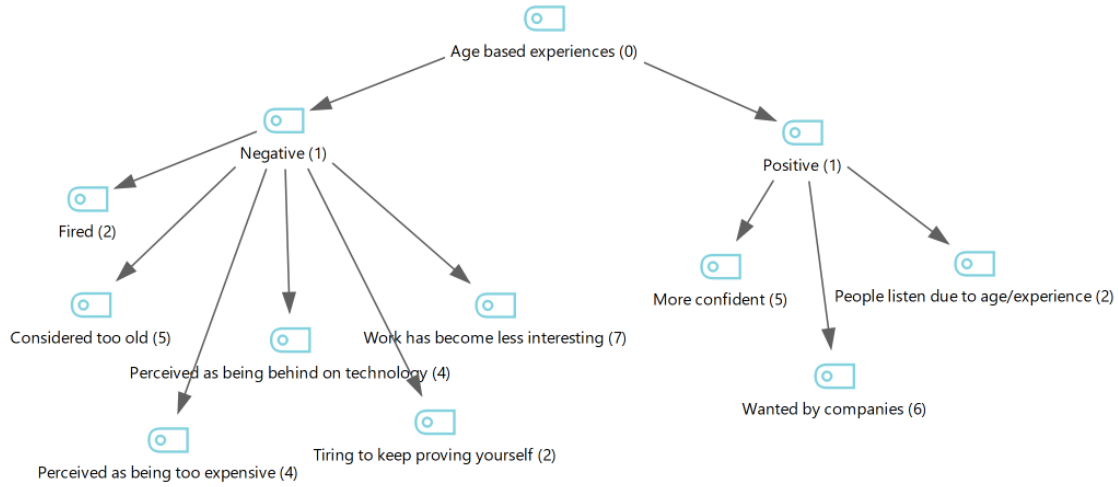


Figure 4.14: All codes including the Age based experiences

Code	Short explanation	#code segments
More confident	Becoming more confident with age	5
People listen due to age/experience	As age or experience increase people start listening more	2
Wanted by companies	Being wanted by companies due to age	6

Table 4.26: Positive experiences in Age based experiences

“I can pick my next job. I can pick from basically whatever I want. You know, I’ve got the experience and the level now that.” - Riley

While experience and level do not have to correlate to age but do at times go hand in hand, however, age is also directly why people mention they can pick their next job.

“I’m old enough to know that I can get another job. I’m old enough to know where I can put my skills. I have a network that I’ve built up so” - Noah

So a positive experience seems to be that with age, the ability to pick a job increases.

In contrast to *Not being taken seriously*, here we see Bobbie and Robin experience *People listen due to age/experience*.

“I’m turning 50 in a few months and I am the second oldest in the company. We have a very very young company. We have a lot of people coming directly from university, so I would say ...[90% is below 35]. And here I do see. All the expectations at me I see people listening to me because I’m older.”

This is the opposite of what some other women experienced in regards to *Not being taken seriously*. However, in both examples from *People listen due to age/experience* the work atmosphere was positive. There are more negative experiences in *Age based experiences*. All the experiences can be seen in Table 4.27.

We have mentioned some of these before, either when discussing the literature or the results of research question 1.

We mentioned *Work has become less interested* before when discussing the strategy *keep teaching yourself (new) tech*. Not wanting to *keep teaching yourself (new) tech* might be due to *Work*

Code	Short explanation	#code segments
Considered too old	Experiences related to others thinking they are too old	5
Fired	Fired due to age	2
Perceives as being behind on technology	People believing that they are behind on the technology	4
Perceives as being being too expensive	People thinking the older developers are expensive	4
Tired to keep proving yourself	Tired of keep proving your capabilities over and over again.	2
Work has become less interesting	The work the participant is doing no longer is as interested as before	7

Table 4.27: Negative experiences in Age based experiences

*has become less interested.* As presented by Alex with the following quote:

“And so I got to a point where. I don’t wanna do this anymore. I don’t think the problems are with the technology. It’s just changing technology. But it’s the same thing over and over again” - Alex

*Perceived as being on technology* and *Perceived as being too expensive* was something we say in the literature when discussing age stereotypes Section 2.1.1. Furthermore, being fired due to age has been an effect of age stereotypes.

Experiences based on being *Considered too old* often relate to a situation where the participants are considered too old to do something.

“Sometime I do run into explicit ageism. I don’t know how many times I’ve heard the comment. You know, ‘my God, you’re still programming at this age’.” - Dani

Dani’s quote highlight that there are people who believe one should not keep programming. This can be related to why some women move to management roles, as it becomes hard to be a contributor.

“You always sort of have to feel like you’re doing a lot more calculating and a lot more well work. Actually, it should just keep doing the same thing. You can’t just concentrate on the work necessarily. That’s a huge disadvantage. It’s really exhausting to try to just sort of prove your existence over and over again. Or prove your competency over and over again. I that’s annoying,” - Sam

Sam’s quote is about *Tired to keep proving yourself*, which she is clearly frustrated by needing to keep proving themselves.

*Tired to keep proving yourself* can be related to being seen as less competent or less technical, as we saw in *Age and/or gender based experiences*. We will see with *Being perceives as not competent/technical*, which is in *Gender based experiences*. We will discuss *Gender based experiences* next.

## Gender based experiences

*Gender based experiences* is the largest of the experiences, with 26 codes, which all can be seen in Figure 4.15.

*Gender based experiences* is split into three, positive, mixed, and negative. Mixed is an experience, which was both negative and positive, thus could not be put in either. We will discuss

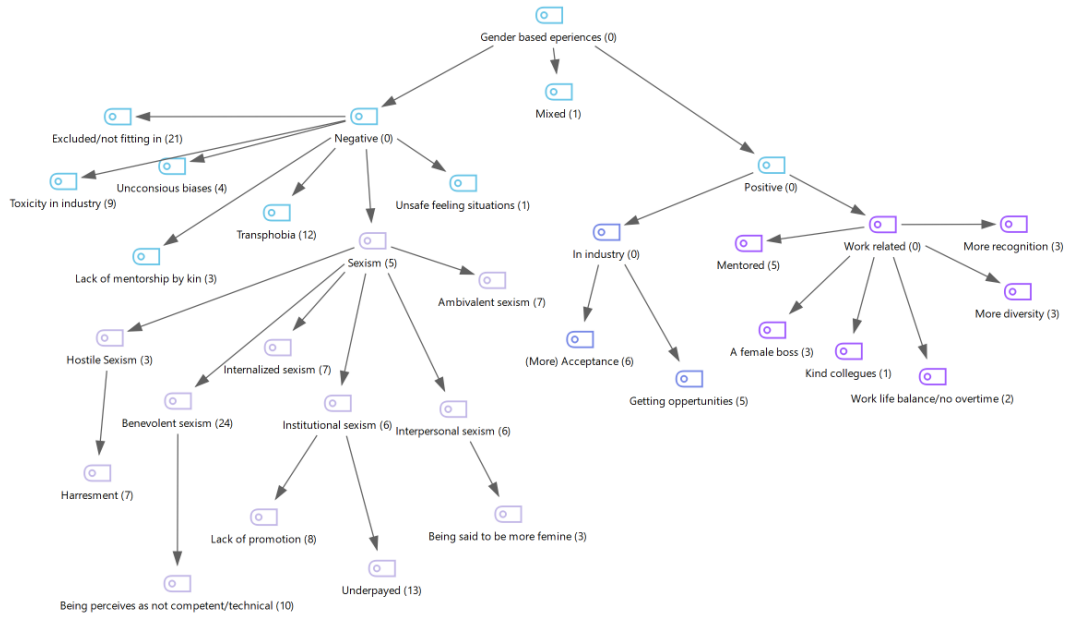


Figure 4.15: All codes including the Gender based experiences

the positive experiences first, again. There are two subcategories in the positive tree, which are *In industry* and *Work related*. The *In industry* related experiences can be seen in Table 4.28 and the *Work related* experiences can be seen Table 4.29.

Code	Short explanation	#code segments
(More) Acceptance	The industry is becoming (more) accepting of different diverse aspects	6
Getting opportunities	Getting opportunities based on gender	5

Table 4.28: Positive experiences relating to the Industry in Gender based experiences

*Getting opportunities* is the same as *More opportunities due to age and gender*, the only difference is that the opportunities now are just related to gender.

“I was always the first woman. And people found that special and also encouraged me. So there was always positive and it gave me also the opportunity to try out new things.” - Bobbie

*(More) acceptance* are experienced when the participants experience that acceptance regarding gender is more accepting.

“The gender thing, the market is coming my way. Like that’s the main thing is like the more people realize or companies realize that like women are their customer.” - Elliot

Elliot discusses how companies want more women and thus accept them more.

Billie also has a positive experience related to *(More) acceptance*:

“[The CMS industry] does not condone discrimination, sexism, gender-ism, whatever ableism. All those -isms. So that has been a very positive experience for me and the years before a lot less.” - Billie

Code	Short explanation	#code segments
Mentored	A positive experience with being mentored	5
A female boss	A positive experience of having a female boss	3
Kind colleagues	Having positives experiences relating to kind colleagues	1
More diversity	Seeing an increase in diversity within the industry	3
More recognition	Having positives experiences relating to kind colleagues	1

Table 4.29: Positive experiences relating to the work in Gender based experiences

There are more positives related to work. Some as expected, such as *kind colleagues*, but several interviewees also see being mentored as positive.

“So my entire career from my first job. I had really really good mentoring from VP of Engineering.” - Elliot

This mentoring does not need to be done by a woman. Mentoring is generally considered a positive regardless of the mentor’s gender. However, having a *female boss* is also seen as a positive.

“Currently my workplace is great, it’s everything that I’ve wanted it to be reporting to a female CTO which is night and day different than reporting to a male CTO” - Alex

This also suggests that Alex has had a negative experience with a male CTO. While Alex did not discuss a negative experience with a male boss, Charlie did.

“Previously, my skip-level was sitting next to me, and he tried to cut my budget, and so I told him ‘I had to cut the team and half because that’s what the budget pays for’, and he said ‘no, no, no. Just like get partway through the year and will come back and ask for more funding’ and I was like ‘no, no’. I know this trap. I know this trap, I’ll get there, and then it’ll be my fault that I mismanaged the budget. I’ve spent all the money. You have to be buttoned upright. I was like ‘no’.” - Charlie

The quote is in relation to *Toxicity in industry* which is part of the *negative gender based experiences*. All the negative based experiences can be seen in Table 4.30.

Code	Short explanation	#code segments
Excluded/not fitting in	The participant feels like they do not fit in with the industry	21
Lack of mentorship by kin	Seeing the lack of any mentorship by kin during their career as a negative	3
Sexism	See Table 4.31	combined 99
Toxicity in industry	Experiences about toxicisty in the industry	9
Transphobia	Seeing transphobia in the industry	12
Unconscious biases	Having negative experiences due to unconcious biases	4
Unsafe feeling situations	Experiences where they felt unsafe	1

Table 4.30: Negative experiences in Gender based experiences

We already touched upon *Toxicity in the industry*, another example of that is:

“Sometimes a subtle or not-so-subtle kind of hostile atmosphere. Which can vary from simply not wanting to be in that kind of a locker room environment to outright hostility” - Dani

Code	Short explanation	#code segments
Ambivalent sexism	Ambivalent sexism is seeing women as good, pure and innocent or seeing them as deceitful, manipulative. Depending on the situation.	7
Benevolent sexism	(1) Believe that women are only meant to be innocent, pure etc. (2) Also seeing <i>being perceived as not technical or incompetent</i>	(1) 24 (2) 10
Hostile Sexism	(1) Believes that lead to being hostile towards women (2) <i>Harassment</i> is such a hostile behaviour	(1) 3 (2) 7
Institutional sexism	(1) Sexism that is part of a organizations and institutions examples are: (2) <i>Lack of promotion</i> (3) <i>Underpaid</i>	(1) 6 (2) 8 (3) 13
Internalized sexism	A person who believes sexist believes about themselves	7
Interpersonal sexism	(1) Sexism happens between people (2) Such as <i>being said to be more feminine</i>	(1) 6 (2) 3

Table 4.31: Negative experiences relating to Sexism in Gender based experiences

The hostility can also be related to sexism. The participants discussed many experiences related to sexism, as can be seen in Table 4.31. The definition used in the table and were used to code the sexist experiences can be seen in [73]. There is a wide variety of sexism the women faced or saw within the industry. From harassment:

“I’ve had a stalker, which is luckily my only sexual harassment experience in IT,” - Robin

To inappropriate comments:

“We were out at dinner. And it was during the me-too thing, and a male colleague turns it to two of us, me and my boss who are both women, and said ‘proof that you’ve been sexually harassed at work,’ and I said, ‘excuse me. And both of us took him in a room the next day and he was practically crying. And we said ‘that is not OK. Um? Isn’t that OK? We do not. We’re not. We don’t perform for you’.” - Jaime

There is a wide range of sexism seen. One of the most commonly mentioned sexism based is *Being perceived as not competent/technical*.

“And especially when they start getting to that, you’re not technical enough. I don’t know how many men with the same equivalent skills as a woman in testing, get called not technical enough.” - Stevie

This is not just seen currently, but also when Robin are at university.

“In university, I could see a difference because younger students came up to me, younger women came up to me and like ‘Do you have time to talk? How do you handle these guys? Do they take you seriously?’ ” - Robin

Stevie is currently noticing women *Being perceived as not competent/technical* while Robin also noticed it back when they were at university. Thus it seems like *Being perceived as not*

*competent/technical* might be something women deal with their entire career. *Being perceived as not competent/technical* is part of *Benevolent Sexism* which is the largest code with 24 experiences. Jaime mentioned several experiences in one answer.

“I was also consistently at that job, put in positions where I couldn’t succeed, or they thought I couldn’t succeed. I did succeed. I was told on my way to a client meeting by the head of sales. ‘While you can’t talk to these people like you talked to your husband,’ and I was like you mean you came to a party at my house once, and you made that judgment. Yeah, I reported him to HR, which didn’t make me any friends. Um, yeah, I mean it happened over and over again. They just didn’t want me there, and I just kept showing up. ” - Jaime

Alex also noticed benevolent sexism related to promotions.

“And I’m not strategic. Now strategic is a code word that a lot of men use to deny women opportunities at higher levels of management.” - Alex

Charlie mentioned being talked over, and their ideas are stolen.

“Also, just like genuinely being talked over by men in meetings and in my career, there has been a number of times where I am definitely the only woman in the room or on the team.” - Charlie

“And I said, ‘you actually took my ideas and present to them as your own’, and he was like, ‘... They’re things that are just existing, and they’re not specifically your ideas there’. I was like ‘what are you talking about?’ And it was just an absolute nonsensical conversation and the injustice was just too much for me, and I was much younger in my career and I just cried. I cried a lot because I had never had my ideas, just so blatantly presented as somebody” - Charlie

All these experiences show the wide range of sexism the women had to deal with throughout their career.

Besides sexism, there was also racism and transphobia. Several interviewees observed transphobia.

“Basically right out of school. I transitioned, you know that weird period where you’re halfway still in school, but you’re at you have a job. But you finishing up the last three credits type thing. Yeah, I was in that position when I transitioned, and in fact I have no degree because like the school made it kind of clear that they didn’t want me to come back and finish” - Dani

The fact that Dani could not finish school could have impacted their career. Dani also had other transphobic experiences.

“I’ve had people refused to work with me. [I] Had somebody get up in arms and insist that they provide me with a separate toilet. I’ve had my share of transphobia on the job.” - Dani

Transphobia was also mentioned by others who saw it happen to others.

“They had all these diversity training and workshops around identity and racial equity. And I have never witnessed more hostile workplace towards transgender people, black people, and women” - Charlie

Charlie also brings up racism, which is a negative experience in General experiences. We will look at General experiences next.

General experiences

General experiences are not directly related to gender and/or age. All the codes in *General experiences* can be seen in Figure 4.16.

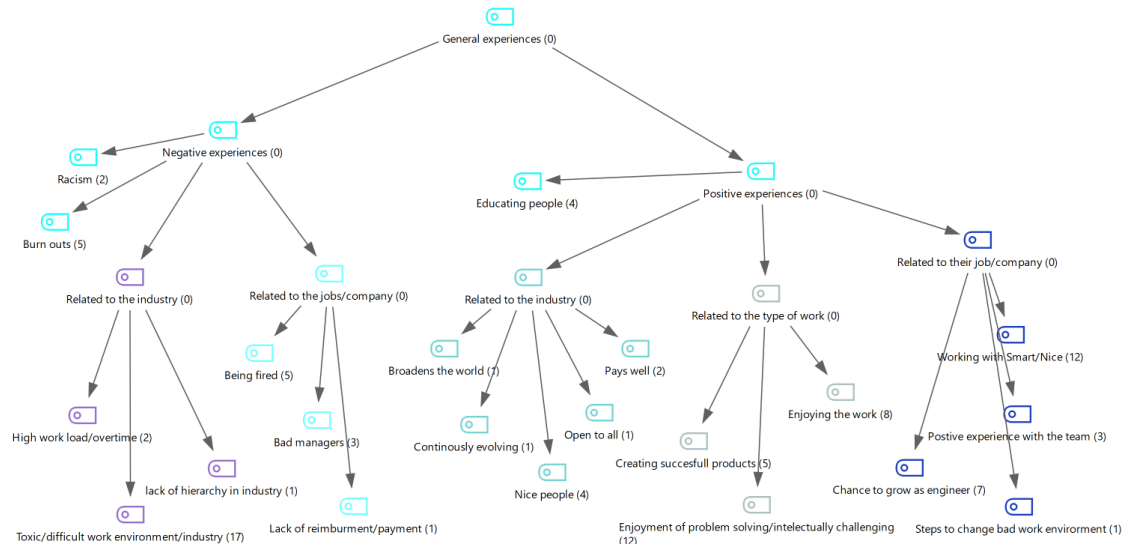


Figure 4.16: All codes including the General experiences

General experiences are also broken up into positive and negative experiences. The positive experiences contain three sub-trees. There is one code outside these sub-trees which can be seen in Table 4.32.

Code	Short explanation	#code segments
Educating others	Being able to educate others in the industry	4

Table 4.32: One of the codes in negative experiences in general experience

One of the mentions related to *Educating others* is from Noah.

“It’s given me the opportunity to really learn from other people and also help bring other developers up. It has been a project where we could give people their first open source commit, which is such a big career builder” - Noah

One of the sub-trees in general experiences is *Related to the type of work*. *Related to the type of work* gives some of the reasons why participants enjoy the type of work they do.

Alex, Charlie, Elliot, Emery, Jackie, Jaime, Noah and Riley mentioned problem-solving as a positive.

“There’s, there’s so many. I mean the overarching thing for me is just. The ways that I’ve gotten to collaborate with people on problem solving” - Noah

And Noah is not alone in their opinion.

Code	Short explanation	#code segments
Creating successfully products	Being apart of building a product which was successfully	5
Enjoying the work	Enjoying the work the participant does	8
Enjoyment of problem solving /intellectually challenging	Having enjoyment in solving problems or dealing with intellectually challenging problems	12

Table 4.33: Related to the type of work in positive experiences of general experiences

“I really enjoyed. Solving problems in a way that people would use their product. So that’s always been part of my thing that people would actually use where I wrote, for code.” - Jackie

Jackie also mentions in this quote *creating successful products*. Emery also enjoys creating successful products.

“I’m motivated by money is everyone is, but I’m more motivated by success in projects” - Emery

More reasons why people enjoy the work they do are mentioned in *Related to their job/company*. However, this time they are related to the job/company that they work(ed) for. The codes *Related to their job/company* are visible in table 4.34

Code	Short explanation	#code segments
Creating Chance to grow as engineer	Being given the opportunity and/or chance to grow.	7
Positive experience with the team	Experiences the participant had with the team that were positive	3
Steps to change bad work environment	Being able to help make work environment better.	1
Working with smart/nice people	Being able to work with nice people at their job	12

Table 4.34: Related to their job/company in Positive experiences of General experiences

*Working with smart/nice* is most commonly mentioned with 12 code segments.

“I’ve known a lot of really bright people. It’s a real pleasure to get to know some of the just some really incredibly world-class minds.” - Dani

Another more common mentioned code is *Change to grow as an engineer*

“And I work on an open source project that’s been going for somewhere on 15 years now. And it’s given me the opportunity to really learn from other people and also help bring other developers up.” - Noah

Lastly, we see *Related to the industry* in Table 4.35

Many of these are self-explanatory, such as *Nice people* and *pays well*.



Code	Short explanation	#code segments
Broadens the world	Software development has broadened the world of the participant	1
Consciously evolving	Positive experiences related to the continuously involving of the industry	1
Nice people	Positive experience with nice people from the industry	4
Open to all	Viewing of the industry open to all as a positive	1
Pays well	The positive experiences related to pay	2

Table 4.35: Related to the Industry in Positive experiences of General experiences

“You can’t be a freelance nurse. You can’t be a freelance medical doctor, but any person really can go into software or IT. By merit, so that’s good and bad” - Emery

As Emery stated, they say *Open to all* as both a positive and a negative, which is related to a lack of hierarchy.

“In my opinion, it’s one of the things that makes it such a vicious profession because there is no um licensed hierarchy. There’s no; everyone has to listen to the doctor and charge. Everyone has to listen to the surgeon.” - Emery

This code and the rest can be seen in Table 4.36, Table 4.37 and Table 4.38.

Code	Short explanation	#code segments
Burn outs	Getting burned out due to being in the software industry	5
Racism	Experiencing or observing racism	2

Table 4.36: Negative experiences of General experiences

Code	Short explanation	#code segments
High work load/overtime	Negative experiences relating to high work load or overtime	2
Toxic managers	Experiencing managers who are considered toxic	17
Lack of hierarchy in industry	Negative opinion regarding the lack of hierarchy in the industry	1

Table 4.37: Negative experiences related to the Industry in General experiences

We already briefly mentioned *racism* before, but this is something also mentioned by Alex and Charlie.

“I am at this point one of two women left standing in tech, and this kind of tells me that the industry is still very toxic for women and people of color.” - Alex

The most commonly mentioned general negative experience is *Toxic/difficult work environment*.

“The two guys in the middle who I had to work with on the daily where super mean and you know, just. They were jerks. We tried to each get each other fired” - Elliot

Strategy	Short explanation	#code segments
Bad managers	Having dealt with bad managers at work	3
Being fired	Being fired from a job	5
Lack of reimbursements/pay	Not receiving reimbursements for cost or not enough pay	1

Table 4.38: Negative experiences related to the job/company in General experiences

“I’ve definitely encountered some really toxic work environments. I’ve had a lot of overtime. Yeah, working in the video game industry, crunch. So, stress, exhaustion, there’s been some really brutal work working environments” - Sam

Sam highlight multiple codes with their quote, *high work load/overtime* and *Toxic/difficult work environment*.

These were the participants’ main experiences regarding age, gender, and general. We also recorded some experiences related to pregnancy or parenthood. We will briefly discuss those.

### Pregnancy/parenthood experiences

We see positive and negative experiences related to pregnancy or parenthood. Both positive and negative can be seen in Figure 4.17

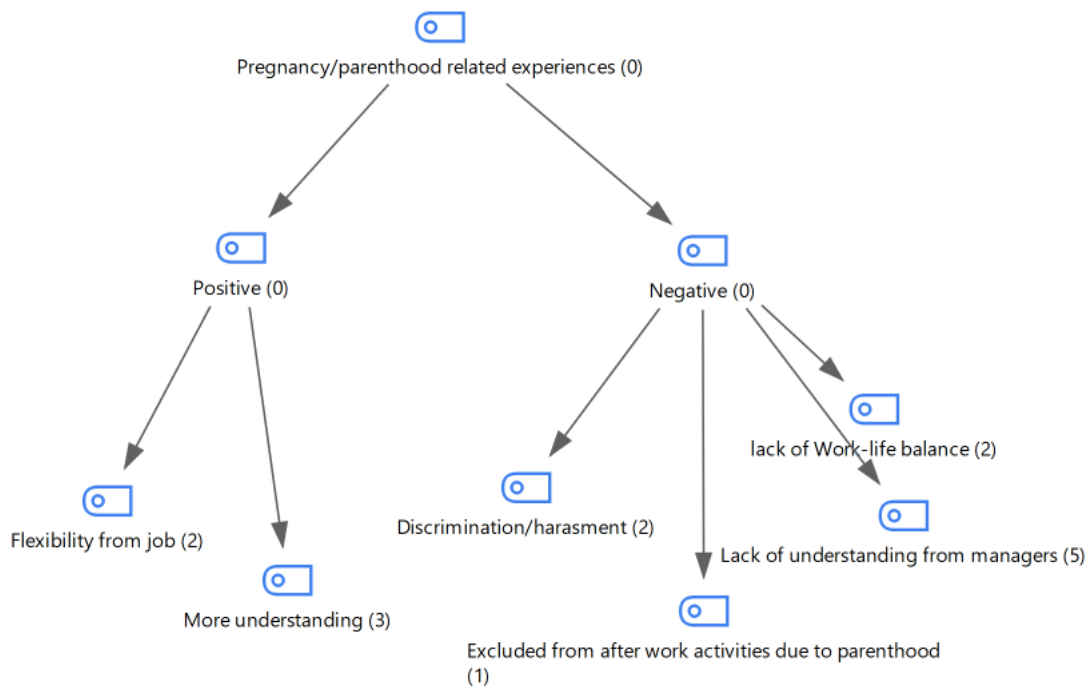


Figure 4.17: All codes including the Pregnancy/parenthood related experience

The positive experiences are in Table 4.39.

“We didn’t have a whole lot of parental leave and all this other stuff and flexible hours. ... The positive interactions I’ve had were with managers that understood that my family was important to me. That parenthood was important to me, and I needed to take that time so they would allow me to leave early or come in later or whatever. That was good.” - Alex

Code	Short explanation	#code segments
Flexibility from job	Receiving flexibility from work in for instance work hours, days, working from home etc.	2
More understanding	Receiving more understanding from managers or boss or colleagues	2

Table 4.39: Positive experiences related to pregnancy and parenthood

Alex was provided with both *Flexibility from job* but also *More understanding*. Which is considered important to more of the participants who identified themselves as parents. We identified four parents, out of which two mentioned *Flexibility from job* and three mentioned how *More understanding* is appreciated, such as Alex’s experience.

However, all four had negative experiences, which can be seen in Table 4.40.

Code	Short explanation	#code segments
Discrimination/ harassment	Being discriminated or harassment based on being pregnant or a parent	2
Excluded from after work activities	Not being able to partake in after work activities	1
Lack of understanding from managers	Managers not understanding the needs of parents or of a pregnant person	5
Lack of work-life balance	Issues regarding balancing duties as a parent vs work	2

Table 4.40: Negative pregnant or Parenthood experiences

*Lack of understanding from managers* is mentioned most commonly, with five mentions by Alex and Riley.

“I was granted some flexibility. ... I had my baby and. They said, ‘Oh yeah because you’re up all night. Maybe you would want to take on, managing or reacting to Technical Support issues as an engineer’. So that was really, I mean, of course I said ‘no’, but I was kind of flabbergasted because it just let me know that they had no clue and these were young younger men.” - Alex

Alex clearly shows that some managers had no idea about being a new parent. Moreover, Alex was not alone in having negative experiences as a parent or during pregnancy.

“I’ve gotten re-org under a manager who had previously taken offense to me being actually a young woman who knew things, and I had contradicted his plan. I had some serious critiques of his plan ‘cause his plan wasn’t going to work. He took major offense at a young woman doing that, and then later, I was re-org underneath him. While I was on maternity leave, I was made [a] scapegoat for a lot of problems. Some of them I had nothing to do with, but I was on maternity leave, so I was totally unable to defend myself.” - Riley

Riley had to deal with *harassment* as she was gone on maternity leave, which caused them to leave their job when they returned. We also see an experience where Jackie was let go because of pregnancy.

“So he said ‘they didn’t tell me you were pregnant. It’s not like you’re going to take a two week vacation in Hawaii.’ I said ‘No, I gonna take three months off. And the department knows how to run itself without me, and I’ve done this before. ’cause this is my second child and I will be in touch after the first month by phone and email’. He said, ‘well, that’s not good enough for me. Besides, my wife didn’t ever go back to work’. So I said ‘I’m not your wife’. ... They said, ‘well, no, we’re gonna start talking about a package,’ which meant that was a severance package, a lay-off which meant I knew I was going to make a whole lot of money. Cause he would not have fired a man for being pregnant or having a pregnant spouse. So I did. It was the best thing that ever happened to me, so they paid me off to go away, which is perfect.” - Jackie

Jackie was let go due to them being pregnant, but it also highlights that they were not fired with their first child when they were under a different manager. Additionally, it seemed like Jackie was the same for their first child, and it was fine. Thus, Jackie was fired purely because the current manager had this bias against mothers.

Next to the *Lack of understanding from managers* and the *Discrimination/harassment*, Alex also brought up an interesting point regarding *Excluded from after work activities*.

“ ‘OK, do you like going out to go drinking with people’ and there’s this startup mentality a lot of times where people go out to to drink, they hang out together for long periods of time. And that’s not compatible with especially women that have kids. And so and the other bad thing about that opportunities are discussed projects or discussed in those environments, and you don’t have access to those things. And so you have lack of access through these conversations of people that have infinitely more free time or have a different kind of lifestyle than you do.” - Alex

Alex discusses how parents and possibly mostly mothers cannot go to after work activities and so lose out on new opportunities, impacting someone’s promotion possibility. The experiences expose a problem with discussing these types of opportunities during after work activities as it is exclusionary to those who cannot attend.

We have seen a wide range of experiences older women have had throughout their careers. While some positive experiences were mentioned, most were negative, which could be due to the interview topic. Some experiences show improvement, such as the ones related to more opportunities. We also still see outdated beliefs.

Several of the negative experiences the participants had can also be linked to feeling values, such as the *lack of promotion*. We will look closely at the feelings related to value while answering research question 3.

### 4.3.3 RQ3: How have women with prolonged careers experienced feeling valued?

Feeling valued is coded, among other things, in the category of perception. The codes related to value can be seen in Figure 4.18

Within value there are three subcategories, *Well valued*, *Mixed* and *Undervalued*. In Table 4.41, we can see the distribution of code segments and the number of people. Thus, there are five more mentioned being well-valued compared to undervalued, as well as two more people who mentioned feeling well valued. Thus, how many of the participants felt valued and undervalued are very similar. We also see mixed, meaning they felt valued at times and not at other times.

In the table, there are more than fourteen people; this is due to that some people mentioned both feeling undervalued and feeling valued in more detail. For instance, someone might have mentioned feeling valued at one company and not the other and the reasons for this.

We will discuss the separate subcategories one by one, excluding mixed. The mixed code segments only contain short mentions that the feeling of value has been different and does not add

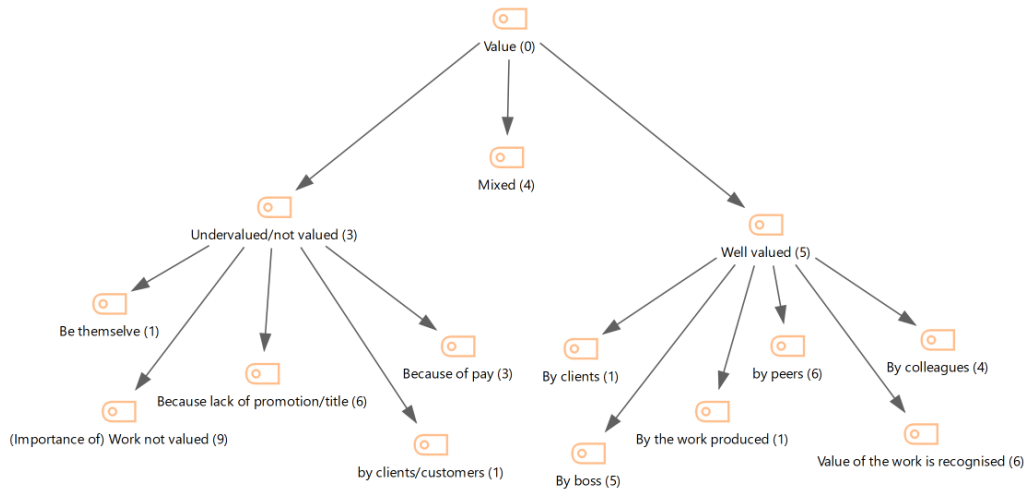


Figure 4.18: All codes related to value

	Well valued	Mixed	Undervalued
Code segments	28	4	23
Number of people	13	4	11

Table 4.41: Distribution of code segments and number of people for Feeling valued

more context.

Firstly, well-valued will be discussed, and the codes relating to doing this can be viewed in Table 4.42.

Code	Short explanation	#code segments
By boss	Being valued by their boss	5
By clients	Being valued by clients	1
By Colleagues	Being valued by colleagues	4
By the work produced	Feeling valued due to the work produced	1
Value of the work is recognised	People recognised the value of the work done	6
By peers	Being valued by peers	6

Table 4.42: Codes related to Well valued

In *Well valued*, we can see that value seems to be a social construct as many of the codes are related to people, such as bosses and clients. We see that *By peers* and *By boss* have most code segments related to people.

“I just got a call today from a woman who is like, ‘I loved what you were doing. Would you consider coming to work at my startup?’ and it feels good to get new opportunities coming towards you. So I feel like my work that even it wasn’t successful was valued” - Charlie

Charlie mentioned a peer who appreciated their work with their own company.

“My boss is always told me I did exceptional work.” - Jackie

In Jackie’s case, their boss told them they did good work.

Charlie’s quote also discusses feeling valued by the work produced.

“But eventually they realize it’s like, ‘Oh no, she’s actually adding value’, and I was so happy [on] Friday when they said ‘Stevie, we have to come in and work over the weekend to, write this code and would you be willing to come work over the weekend too? Because we really need you to test it.’ And then finally. They finally they get it.” - Stevie

Stevie’s quote illustrates how important it was for them when their work was recognized to be valuable. This is not just technical work, but also soft skills are important to be recognized.

“He actually said to me after that, that he valued me before. But he didn’t realize how much impact. I had on the projects we created that the thing about pulling things together, making sure we finish things. A lot of things that were not technical, but that actually mattered for us to produce something good. Um, and he told me afterwards that he didn’t value that until it was missing. But that I’m more at peace with it was harder when I was an employee to see that people did not realize what I was doing. And it made me judge myself harder as well.” - Robin

Robin’s quote also suggests why it is important for value to be recognized by others and the negative it can have if it is not. With Robin, we say they “judge myself harder” because of it. Robin’s feelings are mirrored by others when we look at *Undervalued/not valued*.

The *Undervalued/not valued* codes can be seen in Table 4.43.

Code	Short explanation	#code segments
(Importance of) work not valued	The work is not valued by others	9
By themselves	The participants does not value themselves	1
Because lack of promotion	Not feeling valued because there is a lack of promotion	6
Because of pay	Not feeling valued because the pay is not representative’s	3
By clients/customers	Not being valued by clients/customers	1

Table 4.43: Codes related to Undervalued/not valued

We see that *(Importance of) work not valued* the opposite of several of the quotes we saw in *well valued*.

“I’ve certainly run into a lot of people who didn’t value testers. I’ve often been hired as the first tester or the second or third tester that they ever had in a team or in a company. And I’ve always had to earn my credibility” - Stevie

Stevie also highlights a can be linked to *Tiring to keep proving yourself*, which we discussed in research question 2. While Stevie is not discussing being tired of proving yourself, the lack of value might play a role in becoming tired of it.

Several participants also mentioned the lack of promotion and pay because they felt undervalued.

	Considered leaving	Not considered leaving
Total number of	23	18
Code segments		
Number of people	8	10

Table 4.44: Codes details related to Feeling of leaving

“I said there is no other PM on this floor in this department who has got the same financial like wins for the bottom line, and if I were a man, I would be given this role that is much higher. But no, I’m not getting picked for those things. I had to fight for my promotion, to go from product manager to senior product manager after those accomplishment, and I was asked for ten years of my career history in that justification.” - Charlie

Charlie discusses how not getting a promotion and fighting for it even though others did not have to made them feel undervalued.

Additionally, we do not see a difference between an early career and a later career. So both being valued and not being valued seems to happen at all times of one’s career.

Interestingly, when comparing well valued and undervalued, we see a different types of codes. In valued, we see a lot of relation to people, while in undervalued, we see things like promotion and play a role. This difference would suggest to not feel undervalued; one needs to be paid and promoted in line with what the participant feels they are worth. Nevertheless, to feel valued, one needs recognition from others. We will look into this more in the discussion.

Concluding, we see a mixed reaction relating to being valued. There have been situations where people have felt valued and situations when they have not.

#### 4.3.4 RQ4: How have women felt about leaving the industry throughout their career?

The codes relating to the feeling about leaving are also located in perception as we want to know their perception towards leaving. The codes can be seen in Figure 4.19.

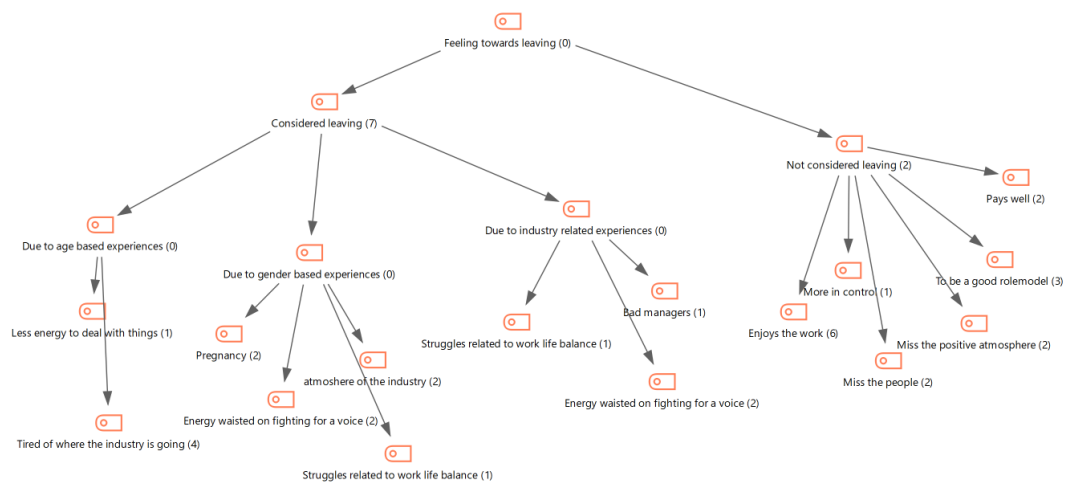


Figure 4.19: All codes related to Feeling towards leaving

The codes related to the feelings of leaving are split in two. Into *Considered leaving* and *Not considered leaving*. The details regarding these codes can be seen in table 4.44.

Again, similarly, as with value, we see that the number of people does not add up to fourteen. In this case, the reason for this is that a few interviewees gave more nuanced answers, for example, not feeling like leaving now, but they did earlier.

We see more mentions about considering leaving, but more people mention not leaving the industry. We will see why this is when looking at the codes more closely.

First, considered leaving contains three subgroups, *Due to age based experiences*, *Due to gender based experiences* and *due to industry related experiences*. *Due to age based experience* is when participants specifically mention age based reasons. *Due to gender based experiences* is related to gender, and *due to industry related experiences* is related to the industry. If the interviewee mentions no specific reasons, the code is added to the *considered leaving* code. An example of a non-specific reason is:

“I came close twice.” - Riley

We will take a closer look at the other subgroup.

*Due to age based experiences* subgroup can be seen in Table 4.45.

Code	Short explanation	#code segments
Less energy to deal with things	Not having the energy to deal with things related to the industry.	1
Tired of where the industry is going	Becoming let interested of what is happening in the industry	4

Table 4.45: Considered leaving due to Age based experiences

Bobbie and Emery mentioned *tired of where the industry is going* as reasons why they considered leaving the industry. We had already seen experiences related to these reasons when we discussed *Work has become less interesting*, in negative experiences regarding age.

“They’re making me just, I’m just so sick of them. Nothing works, nothing works right.” - Emery

Having less energy to deal with certain things within the industry is closely related to tired where the industry is going.

“The older I get, the less I wanna deal with. The young girl was. It was like I had all this energy. I can do all this stuff. Yeah, sure, I’ll work on more hours than I should. Yeah, I’ll put all this stuff on hold. Yes, I’ll do this. I won’t do that anymore. ... Life is too short.” - Alex

As Alex shows, there is less interest in keeping up with the high work pace. These reasons seem to come with aging.

We also see gender related reasons why people consider leaving or have considered leaving in the past. The gender related reasons can be seen in Table 4.46.

We see *pregnancy* as a reason related to why women leave.

“I took a really long maternity leave. I took nine, well long for the US. I took, I took nine months and I negotiated that with the company I was working at. I was not, a lot of that was unpaid. And I was not guaranteed my job back. ... But I really wanted to think about like, do I want to continue doing this job? I’d worked some terrible overtime right before” - Sam

Sam also addresses concerns regarding overtime and having a baby. This concern is concerning another reason why we see a participant consider leaving, which is *Struggles related to work life*



Code	Short explanation	#code segments
Energy wasted on fighting for a voice	Tired by having to continuously fight to be heard.	2
Pregnancy	Considered leaving due to pregnancy related reasons	2
Struggles related to work life balance	Considered due to trouble with work-life balance	1
Atmosphere of the industry	Considered leaving due to the hostile industry	2

Table 4.46: Considered leaving due to Gender based experiences

balance.

Some of the gender related reasons might also have an element of age, such as *Energy wasted on fighting for a voice*. The same reason was also mentioned in industry related reasons. Moreover, the code segments are related to each other as it is about the same story.

“When you are just spending all your energy into, fighting people trying to knock you down and people who just want you to not have a voice and to not make decisions. Just the fight against that. Just the fight to try and get something done the right way. It. It’s so exhausting.” - Emery

*Energy wasted on fighting for a voice* with the other codes in industry related can be seen in Table 4.47.

Code	Short explanation	#code segments
Bad managers	Considering leaving due to bad managers.	2
Energy wasted on fighting for a voice	Tired of having to continuously fight to be heard.	2
Struggles related to work life balance	Considered due to trouble with work-life balance	1

Table 4.47: Considered leaving due to Industry based experiences

*Struggles related to work life balance* is the same as mentioned in relation to gender. However, Sam also mentioned that some of her male peers also deal with work-life balance and overtime, which is why we also see this reason related to the industry. As overtime is an issue, the industry is.

*Bad managers* is given the last reason for why participants considered leaving.

“Many times whenever I run into a block in my career when there are megalomaniac managers. When they were, whenever there are leaders of a company that just aren’t inspiring to me”  
- Alex

As we discussed, there are several reasons why the participants. Have left, but none of the participants have completely left the industry. While some have taken breaks for longer periods, none have left the industry, but they did see others leave. However, these reasons were also coded and kept separate from the rest of the codes to keep them distinct. They are located in *industry* in the category *perception*. The reasons mentioned here are: pregnancy or being a caregiver, Lack of flexibility, and Lack of promotion.

However, the participants also gave several reasons for not considering leaving. The reasons why are listed in Table 4.48.

Code	Short explanation	#code segments
Enjoys the work	Finding enjoyment in the work one does	6
Miss the people	They would miss the people they work with or peer.	2
Miss the positive atmosphere	Would miss the positive culture within the industry	2
More in control	Being more in control over ones career	1
Pays well	The work pays well	2
To be a good role model	Would not leave because they want to be a good role model	3

Table 4.48: Not considered leaving

	Assigned differently	Same as others
Total number of code segments	18	6
Number of people	10	6

Table 4.49: Code distribution of task assignment

Most of the surrounds positives regarding the industry; nice people, good atmosphere, enjoyment of work.

“But I would miss all the geeks. ... Or you know, silly stuff. My sister goes, how can you have so many stickers on your computer when you just started in this job? And that you know, we have geeky T-shirts that we discuss anything from.” - Robin

Another interesting reason is *to be a good role model*, is being a role model to family members.

“The thing that kept me in so long was my daughter. I didn’t want to quit because I didn’t want her to quit” - Alex

But also to be a role model for the industry.

“I have two women I’ve worked with for the last decade off and on in different projects. And one of them just retired, and they’re both ten years older than me. One of them is even more than ten years older than me, and they’ve been programming and writing code since they went to college. And you know, to have women in this industry who are in their 50s and 60s. And they’re writing code in shipping code and keeping their skills like modern and like that’s been huge to me and I want to be that for other people” - Charlie

These reasons have given insights into why women might leave the industry and why they considered leaving, but it also discusses why the participant did not consider leaving.

#### 4.3.5 RQ5: How have women with prolonged careers experienced task assignment?

The codes related to task assignments are in the category perception and can be seen in Figure 4.20.

*Task assignment* is split into *Assigned differently* and *Same as others*. The distribution of codes related to *Task assignment* can be seen in Table 4.49.

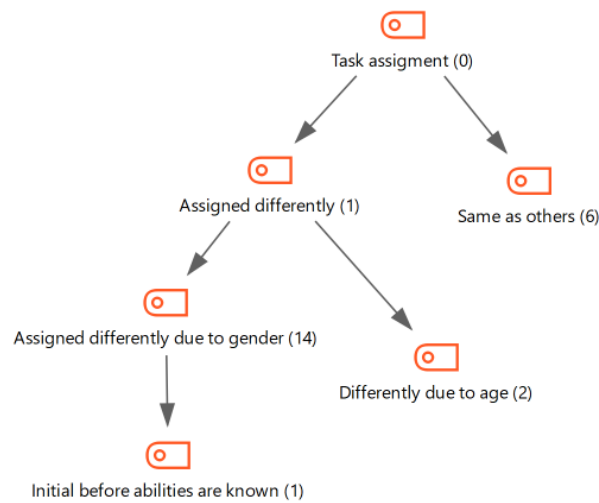


Figure 4.20: All codes related to Task assignment

It shows that *Assigned differently* has 18 mentions by Alex, Charlie, Dani, Emery, Jackie, Jaime, Noah, Riley, Robin, and Stevie. Additionally, it shows *Same as others* has six mentions by Billie, Bobbie, Charlie, Elliot, Jaime, and Sam. Some of the participants mentioned both situations relating to being assigned tasks differently as it being the same ask others.

*Assigned differently* are codes about experiences or mentions where tasks have been assigned differently, which are either related to gender or age, which can be seen in Table 4.50.

Code	Short explanation	#code segments
Assigned differently due to gender	(1) Task assignment is done based on gender	(1) 14
	(2) which could be before abilities were known	(2) 1
Differently due to age	Task assignment is done based on age	6

Table 4.50: Task assignment done differently

There are fifteen differently assigned tasks due to gender, which is the most of the options. Alex, Stevie, Emery, pointed out what type of task they got assigned.

“I feel like I’m usually assigned a task to get everyone together. Take notes. Organize a celebration. Uhm, you know all of the social stuff that never gets you ahead.” - Alex

“I have sometimes been given, sort of, jobs nobody wants. The low glamour jobs” - Stevie

“ I definitely felt like they put me in a role that was not up to my abilities and they gave a different role that I was more interested into a guy who was. I mean, I’ve never seen anything like him. He’s incredibly incompetent.” - Emery

Stevie highlighted that the jobs they got assigned were the low glamour jobs, which might lead to not being promoted or a pay raise.

Emery also highlighted that a colleague who was a man got a job Emery was interested in even though the man was incompetent. Which would make one wonder why he was picked.

Emery also noted that this especially happened initially before abilities were known.

“In any kind of initial period, so the managers is new, he doesn’t know me or I am new they don’t know me.” - Emery

Dani suggested that transphobia might also affect task assignments.

“Yeah, I mean in my case it’s also really hard to separate that out from transphobia.” - Dani

Besides gender based strategies, there are also mentions of age based task assignment. There were two mentions related to age based task assignment.

“I do get assigned definitely more senior tasks, but I am a more senior role. I’m a principle level, and so that expectation is there when I think about my peers and people older than me or younger than me. I feel like my tasks that are assigned are pretty right-sized for my age.” - Charlie

“As I’ve gotten more experienced, I get the opposite [less glamorous], which is that people hand me things that they don’t know if this is a good idea. They don’t know if it’ll work, they don’t actually know if anybody can do it, and I love those kinds of challenges, but I also know that they’re kind of pitfalls, right? Because you know you put somebody in that position. They’re a little bit expendable. You’re picking a person that you’re OK with them failing.” - Noah

Receiving task assignments in line with one’s role and ability is not an issue. However, task assignments based on being considered expendable could be a problem. Older developers might also have issues with finding a different job if they were expanded.

Several strategies related to task assignments are different from others. Those mentioned were; *Volunteering for tasks* and *Involving people in work*.

There are several mentions concerning the task assignments being the same as others.

“I think I got assigned the same kind of stuff everyone else did.” - Sam

There is a specific mention of task assignments being the same regarding age.

“I wouldn’t say younger colleagues.” - Jaime

There is no clear indication if gender or age based task assignments are mostly happening in early or late career.

Thus we see that there is gendered task assignment, and this may happen throughout a women’s career. There might be task assignments based on age. However, this is not exclusively negative.

## Chapter 5

# Discussion

In this chapter, we will discuss the results from the previous chapter and put in in the context of already existing literature when possible.

The repeating of codes or similar codes (i.e., *Changing companies*) in different categories shows the complexity of the intersection between age and gender. An option would have been to consolidate the codebook. However, it was more important to distinguish when we are discussing age, when gender and when both. It is hard to distinguish when it is a combination of gender and age, just gender, just age, or neither. The complexity of these issues shows that more research is needed into the intersection of age and gender.

### 5.1 Visibility

Many of the strategies and experiences mentioned throughout the interviews seem to connect to visibility or the lack thereof. Visibility is critical for career progression, and a lack of visibility might lead women to lose out on promotions [74]. Another reason for lack of promotion might be that supervisors are unlikely to attribute women's performance to skills rather than luck [75]. This could be why some participants in the interviews emphasize getting credit for their work. The reason why some of the participants did this strategy is equity. One of the interviewees directly connected men stealing ideas and getting the promotion and women being overlooked. Additionally, noting down one's accomplishments could also be associated with supervisors thinking women's performance is due to luck. Because supervisors do not recognize the skills, women themselves might need to recognize them. Some suggest that visibility can be increased by getting involved with challenging assignments [76], social events such as conferences and networks [77]. We also see these and similar strategies; *speaking at conferences*, *networking* and *gathering allies*. Speaking at conferences is a method to increase one's network as it is possible to meet new people at these conferences. Other strategies that could help with increasing one's network are in *Side projects*. One of the women directly linked them to these strategies to increase visibility and career progression. Additionally, they linked it to getting job offers. Networking and gathering allies are similar strategies linked to getting more visibility. A benefit of networking is that it helps women overcome the feeling of exclusion and can help provide a sense of identity. Networks have been a part of IT, the 'old boys network', which has been linked to excluding of women [78]. All women networks have been established to go against this exclusion [79]. The benefits of all women networks are career advancement, and support [79]. These benefits mentioned by Berkelaar (1991) are similar to what some of the participants mention in regards *Networking* and *Gathering Allies*. Interviewees say these networks are supported and give the ability to learn from others and help each other. An interviewee has linked this network to why they feel confident in changing companies if needed.

Other strategies that could be linked to increasing visibility are in *Side projects*. Most strategies in *Side project* would directly or indirectly increase visibility; for instance, *Write books/articles/b-log posts* can increase visibilities as more people would be aware of one's work.

As mentioned before, challenging assignments can increase visibility. However, in the interview, we saw that some women find that they are assigned less glamorous tasks. A method to go against this strategy is related to *Volunteering for tasks* was commonly mentioned as a response to getting assigned tasks based on gender. However, this volunteering would most likely also lead to more challenging tasks and thus can help with visibility within a company. *Involving people in work* has also been mentioned concerning gender task assignment. *Involving people in work* would also allow others to see the work that goes into these less glamorous tasks, which could increase the visibility of the tasks and thus the work.

Besides lack of visibility, there is also over-exposure for women [80]. As a participant put in Tyler and Cohen's (2010) research: "I think as a woman you're expected to be always happy, happy, shiny, accessible for people to come and talk to" [80]. We also saw this opinion that women needed to be happy, even if it was not appropriate.

"[The CEO] was like, 'Are you OK?' And I was like, 'I am definitely OK, why?' And he's like, 'Are you sure? [...] I mean, you didn't smile one time in that meeting' [...] I was like '... And there was arguing like it's not a context to smile like I'm definitely OK'." - Charlie

Additionally, this over-exposure might relate to the feeling that women have to work hard and be better. Surveys have indicated that women must work hard than men [81]. Gorman connects this gender difference to stricter working standards for women than men.

While we do not see women need to work harder directly in our interviews, it is implied occasionally.

"Or why do all women have to be a superstar? What's wrong with being mediocre?" - Emery

More strategies found in the interviews could possibly increase one's visibility. However, to the author's knowledge, these have not been mentioned in the literature previously. Strategies such as *Standing up for yourself* and *Interrupting/dominating the conversation*, both these strategies have vocal components meaning that people might be noticed more. Other strategies can be *Asking (hard) questions*, these questions are commonly to ask why they did not receive a promotion. Asking these questions might clarify to supervisors the goal someone has and thus make them more visible regarding promotion. Lastly, strategies that could increase visibility for women overall are related to *Increasing internal diversity*, as more women could lead to more visibility.

## 5.2 Changing appearance

In the results, we saw *Changing appearance* concerning being less and more feminine. More than half of the mentions regarding *less feminine/more gender neutral* happened in their early career, and a little less than half of the mentions regarding *more feminine* happen in later careers. Thus, some people seem to shift from less feminine to more feminine. The reason that some women feel like they need to dress less femininely could be related to stereotypes. Sczesny et al. (2006) performed two experiments to determine how physical appearance and sex influence gender stereotypes [82]. They found that physical appearance influences gender stereotypes concerning leadership competence. Thus those who presented with a masculine appearance were ascribed to have higher leadership qualities than those with a feminine appearance, regardless of their sex [82]. Fleischmann et al. (2016) support the findings that feminine appearance activates female gender stereotypes [83]. Additionally, they found that participants assumed women in feminine outfits would be less successful in solving computer tasks than women in gender-neutral clothing. Moreover, they found that participants also estimated that women dressed femininely would take longer to complete the task and rated the computer skills of the women in feminine clothing lower than those in gender-neutral outfits [83].

These findings might explain why some software development women actively change their dress to be more masculine or gender-neutral. Firstly, to be perceived as more competent and

seen as more leadership material. This would also align with the findings that several women decide to dress more femininely in their later careers as several women have moved to leadership/-management positions and might not feel the need to conform anymore. Secondly, in their later careers, women might feel more confident in their skills and care less about if they are perceived as such.

### 5.3 Valued and Undervalued

We mentioned how we saw pay and promotion playing a part regarding undervalued. However, when we discuss the value, we see social aspects as being valued by one's boss, colleagues, etcetera. Some literature could explain why we see those codes. People feel devalued when pay is deficient, but people do not feel valued when it is present [84]. Promotion is a method to feel value, as personal development is seen as a method to value people, but fairness plays a role here [84]. The lack of fairness might be why we see *lack of promotion* in undervalued because promotion is perceived as unfair. Inclusion also plays a role in feeling valued. Being included is often linked to a feeling of being valued [84], which could be the reason that we see the social aspect in *Feeling valued*.

### 5.4 Leaving

We have discussed several different aspects that play a role in why people feel like leaving. The literature discusses why women leave, and the industry plays a large role. The technology sector is known for its overtime, heavy workloads, and pressure of deadlines, which can be a source of frustration and exhaustion [85]. Women also face more sexism, workplace bullying, a pay gap, a glass ceiling, and difficulties being accepted as supervisors [85]. Additionally, there is still an expectation at home for women, which might conflict with work expectations [85]. Interestingly, when women leave their profession, they tend to leave the industry, thus suggesting they view the issues as being industry-wide, not specific to a company [85].

We see a similar feeling in the interviews. Reasons for leaving have been related to work-life balance, not being taken seriously, feeling excluded, etcetera. The two people who did leave the industry did completely leave the industry but also returned at some point—suggesting that there was a method to return and that leaving does not have to be forever.

## Chapter 6

# Threads to Validity

In this chapter, we will discuss the threats to the validity of the research. The framework used to identify threats is Wohlin et al. (2012) [86]. Four different threats were identified that fit within Wohlin et al. (2012) framework. We will discuss the threats and what was done to mitigate these threats.

### 6.1 Construct validity

When there is a threat to construct validity, the operational measures studies do not represent the research. There is one main construct validity, which is that the participants might give favorable answers. It is possible that the interviewee does not mention strategies and experiences that put themselves in a negative light. We expressly ask about others and what they do in the interview to limit this threat. This still allows for more negative strategies and experiences to be mentioned.

### 6.2 Internal Validity

When there are threats to internal validity, it means that there is a factor not researched that affected the investigated fact. The threats to internal validity is regarding how the sample was obtained. The interviewees were sampled through Twitter, which means that people who do not use Twitter were immediately excluded from the research. People who are not active on social media may have different responses to the interview question. To mitigate this threat, we added snowballing method to include people who did not participate in the Twitter thread, which we used to sample participants. However, the number of participants sampled through snowballing was low regardless of our efforts. Thus it is possible due to how we sampled the participants; the results have limited generalization. However, the research is qualitative and exploratory, and thus the results should be verified with a survey.

### 6.3 External Validity

Threats to external validity reduce generalization. We look at a specific demographic, and anybody outside that demographic is out of scope for this research. However, people outside of the demographic may have insight into the study topics, and thus, the study could be missing those insights.

### 6.4 Conclusion Validity

Threats to conclusion validity are regarding the ability to draw correct conclusions about the relationship between treatment and the results. We can have threats to conclusion validity because



one person did the interviewing and the coding of the interviews. It is possible that during the coding, information was missed due to interpretation. Additionally, the code segments might have been wrongly interpreted and ended up within the wrong code. Additionally, because of the intersection of age and gender complexness, specific code segments pertaining to one, or the other, or both, might have ended up in the wrong category. The interviews and codings are checked multiple times at multiple stages to ensure nothing important was missed to limit the effect of this threat. Another method to limit this threat is related to member checking. Part of the results relating to strategies was presented at a conference held by the British Computer Society <sup>1</sup>. We mentioned six specific strategies. All strategies mentioned have at least two mentions. The six mentioned were picked to show some new strategies not commonly seen in literature and some more commonly mentioned ones. Several of the attendees recognized some of the strategies. Thus suggesting that the strategies mentioned are also seen by people outside the sample.

---

<sup>1</sup><https://ossg.bcs.org/blog/event/open-source-inclusivity/>

## Chapter 7

# Conclusions

In this research, we try to answer several research questions concerning age and gender. The main question is about strategies women have adopted. Moreover, we looked at the gender and age related experiences, task assignments, and feelings towards leaving and feeling valued.

The results showed that several strategies based on gaining visibility could be used to stay within the industry. Additionally, we see experiences related to both age and gender that align with the stereotypes and previous findings. Moreover, we discussed task assignments and what strategy one can use to keep from gendered or age based task assignments. Additionally, we discussed feelings towards leaving and feeling valued. These results also show the complexity of the intersection between age and gender and the difficulty separating the two effects and distinguishing when the effects play a role.

The results of this research can be helpful to several different parties.

First, it can be useful for women in the industry. Women might struggle in the industry and consider leaving. Some of the strategies could help with these struggles. Additionally, certain strategies are specific to having a long, successful career, such as *Side projects* and other women might find these strategies helpful.

Moreover, new women entering the field could find the results useful, as being aware of the experiences women have and what other women have done to stay in the industry could help them in a few methods. First, being aware of what one could face when entering the industry could help to approach those situations better. Furthermore, knowing the strategies could help approach situations better. The newcomers do not need to figure out everything for themselves. Additionally, an organization might have a use for the results. An organization could facilitate some of the strategies found, for instance, the one related to *Side projects* and *Networking*. An organization makes it easier for women to attend conferences and thus allows women to gain more visibility. As well as, an organization could help women build networks which again would increase visibility. The other aspects can also be helpful to know for an organization as they could help mitigate negative experiences and learn what to do from the positive ones. For instance, making organizations aware of stealing ideas could help prevent this from happening. However, it is important to mention that the results are not an alternative to systemic change. It should not be assumed that an individual can change the situation with these strategies but could use them as tools to tackle specific issues.

### 7.1 Future work

The intersection between age and gender is a complex problem and thus should be researched more to gain a better insight into this intersection. Regarding the strategies and experiences, we see difficulty separating when matters are related to age, gender, or both. A survey with both men and women of different ages could help distinguish the difference between these aspects. Additionally, performing a survey to see if more women recognize the strategies found within this

research could help generalize the finding found.

# Bibliography

- [1] Mónica Segovia-Pérez, Rosa Belén Castro Núñez, Rosa Santero Sánchez, and Pilar Laguna Sánchez. Being a woman in an ict job: An analysis of the gender pay gap and discrimination in spain. *New Technology, Work and Employment*, 35(1):20–39, 2020.
- [2] Susan Bandias and Leoni Warne. Women in ict–retain and sustain: An overview of the acs-w survey. *ACIS 2009 Proceedings*, 103, 2009.
- [3] Marie Griffiths, Claire Keogh, Karenza Moore, Helen J. Richardson, and Angela Tattersall. Inclusion through the ages? gender, ict workplaces, and life stage experiences in england. In Eileen M. Trauth, Debra Howcroft, Tom Butler, Brian Fitzgerald, and Janice I. DeGross, editors, *Social Inclusion: Societal and Organizational Implications for Information Systems - IFIP TC8 WG8.2 International Working Conference, July 12-15, 2006, Limerick, Ireland*, volume 208 of *IFIP*, pages 153–168. Springer, 2006.
- [4] Marie Griffiths and Karenza Moore. ‘disappearing women’: A study of women who left the uk ict sector. *Journal of technology management & innovation*, 5(1):95–107, 2010.
- [5] Barbara J Crump, Keri A Logan, and Andrea McIlroy. Does gender still matter? a study of the views of women in the ict industry in new zealand. *Gender, Work & Organization*, 14(4):349–370, 2007.
- [6] Erin I Demaiter and Tracey L Adams. “i really didn’t have any problems with the male-female thing until...”: Successful women’s experiences in it organizations. *Canadian Journal of Sociology*, 34(1):31–54, 2009.
- [7] Susan Bandias and Rajeev Sharma. The workplace implications of ageism for women in the australian ict sector. *The Workplace Implications of Ageism for Women in the Australian ICT Sector*, 6(4):7–17, 2016.
- [8] Accenture and Girls who code. Resetting tech culture 5 strategies to keep women in tech. [urlhttps://www.accenture.com/\\_acnmedia/PDF-134/Accenture-A4-GWC-Report-Final1.pdf](https://www.accenture.com/_acnmedia/PDF-134/Accenture-A4-GWC-Report-Final1.pdf), 2020.
- [9] Barbara J Crump and Keri Logan. Women in an alien environment. *New Zealand Journal of Applied Computing and Information Technology*, 4(1):28–35, 2000.
- [10] Cristina Díaz-García, Angela González-Moreno, and Francisco Jose Sáez-Martínez. Gender diversity within r&d teams: Its impact on radicalness of innovation. *Innovation*, 15(2):149–160, 2013.
- [11] Cristina Quintana-García and Carlos A. Benavides-Velasco. Innovative competence, exploration and exploitation: The influence of technological diversification. *Research Policy*, 37(3):492–507, 2008.
- [12] Bogdan Vasilescu, Daryl Posnett, Baishakhi Ray, Mark G. J. van den Brand, Alexander Serebrenik, Premkumar T. Devanbu, and Vladimir Filkov. Gender and tenure diversity in

- github teams. In Bo Begole, Jinwoo Kim, Kori Inkpen, and Woontack Woo, editors, *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, CHI 2015, Seoul, Republic of Korea, April 18-23, 2015*, pages 3789–3798. ACM, 2015.
- [13] Gemma Catolino, Fabio Palomba, Damian A. Tamburri, Alexander Serebrenik, and Filomena Ferrucci. Gender diversity and women in software teams: how do they affect community smells? In Rick Kazman and Liliana Pasquale, editors, *Proceedings of the 41st International Conference on Software Engineering: Software Engineering in Society, ICSE 2019, Montreal, QC, Canada, May 25-31, 2019*, pages 11–20. ACM, 2019.
- [14] Kelly Blincoe, Olga Springer, and Michal R. Wrobel. Perceptions of gender diversity’s impact on mood in software development teams. *IEEE Software*, 36(5):51–56, 2019.
- [15] Christian R. Østergaard, Bram Timmermans, and Kari Kristinsson. Does a different view create something new? the effect of employee diversity on innovation. *Research Policy*, 40(3):500–509, 2011.
- [16] Els Rommes, Geertjan Overbeek, Ron Scholte, Rutger Engels, and Raymond De Kemp. ‘i’m not interested in computers’: Gender-based occupational choices of adolescents. *Information, Communication & Society*, 10(3):299–319, 2007.
- [17] Sapna Cheryan, Victoria C Plaut, Caitlin Handron, and Lauren Hudson. The stereotypical computer scientist: Gendered media representations as a barrier to inclusion for women. *Sex roles*, 69(1):58–71, 2013.
- [18] Catherine Porter and Danila Serra. Gender differences in the choice of major: The importance of female role models. *American Economic Journal: Applied Economics*, 12(3):226–54, 2020.
- [19] Corinna Kröhn, Iris Groher, Barbara Sabitzer, and Lisa Kuka. Female computer scientists needed: Approaches for closing the gender gap. In *IEEE Frontiers in Education Conference, FIE 2020, Uppsala, Sweden, October 21-24, 2020*, pages 1–4. IEEE, 2020.
- [20] Gema Rodríguez-Pérez, Reza Nadri, and Meiyappan Nagappan. Perceived diversity in software engineering: a systematic literature review. *Empirical Software Engineering*, 26(5):1–38, 2021.
- [21] Uta Schloegel, Sebastian Stegmann, Alexander Maedche, and Rolf van Dick. Age stereotypes in agile software development - an empirical study of performance expectations. *Information Technology & People*, 31(1):41–62, 2018.
- [22] Uta Schloegel, Sebastian Stegmann, Rolf Van Dick, and Alexander Maedche. Age stereotypes in distributed software development: The impact of culture on age-related performance expectations. *Information & Software Technology*, 97:146–162, 2018.
- [23] Jennifer L. Davidson, Umme Ayda Mannan, Rithika Naik, Ishneet Dua, and Carlos Jensen. Older adults and free/open source software: A diary study of first-time contributors. In *Proceedings of The International Symposium on Open Collaboration*, page 5. ACM, 2014.
- [24] Uta Schloegel, Sebastian Stegmann, Alexander Maedche, and Rolf van Dick. Reducing age stereotypes in software development: The effects of awareness- and cooperation-based diversity interventions. *Journal of Systems and Software*, 121:1–15, 2016.
- [25] Tammy Duerden Comeau and Candace L Kemp. Intersections of age and masculinities in the information technology industry. *Ageing & Society*, 27(2):215–232, 2007.
- [26] Libby Brooke. Prolonging the careers of older information technology workers: continuity, exit or retirement transitions? *Ageing and Society*, 29(2):237–256, 2009.

- 
- [27] Richard A Posthuma and Michael A Champion. Age stereotypes in the workplace: Common stereotypes, moderators, and future research directions. *Journal of management*, 35(1):158–188, 2009.
  - [28] Aiwu Xia and Brian H. Kleiner. Discrimination in the computer industry. *Equal Opportunities International*, 20(5/6/7):117–120, 2001.
  - [29] Victor W Marshall. A life course perspective on information technology work. *Journal of Applied Gerontology*, 30(2):185–198, 2011.
  - [30] Jennifer L. Davidson, Rithika Naik, U. Ayda Mannan, Amir Azarbakht, and Carlos Jensen. On older adults in free/open source software: reflections of contributors and community leaders. In Scott D. Fleming, Andrew Fish, and Christopher Scaffidi, editors, *IEEE Symposium on Visual Languages and Human-Centric Computing, VL/HCC 2014, Melbourne, VIC, Australia, July 28 - August 1, 2014*, pages 93–100. IEEE, 2014.
  - [31] Sebastian Baltes, George Park, and Alexander Serebrenik. Is 40 the new 60? how popular media portrays the employability of older software developers. *IEEE Software*, 37(6):26–31, 2020.
  - [32] Grzegorz Kowalik and Radoslaw Nielek. Senior programmers: Characteristics of elderly users from stack overflow. In Emma S. Spiro and Yong-Yeol Ahn, editors, *Social Informatics - 8th International Conference, SocInfo 2016, Bellevue, WA, USA, November 11-14, 2016, Proceedings, Part II*, volume 10047 of *Lecture Notes in Computer Science*, pages 87–96, 2016.
  - [33] Ned Kock, Murad Moqbel, Yusun Jung, and Thant Syn. Do older programmers perform as well as young ones? exploring the intermediate effects of stress and programming experience. *Cognition, Technology & Work*, 20(3):489–504, 2018.
  - [34] Patrick Morrison, Rahul Pandita, Emerson R. Murphy-Hill, and Anne McLaughlin. Veteran developers’ contributions and motivations: An open source perspective. In Alan Blackwell, Beryl Plimmer, and Gem Stapleton, editors, *2016 IEEE Symposium on Visual Languages and Human-Centric Computing*, pages 171–179. IEEE, 2016.
  - [35] Patrick Morrison and Emerson R. Murphy-Hill. Is programming knowledge related to age? an exploration of stack overflow. In Thomas Zimmermann, Massimiliano Di Penta, and Sunghun Kim, editors, *Proceedings of the 10th Working Conference on Mining Software Repositories, MSR ’13, San Francisco, CA, USA, May 18-19, 2013*, pages 69–72. IEEE / ACM, 2013.
  - [36] Yukasa Murakami, Masateru Tsunoda, and Hidetake Uwano. Wap: Does reviewer age affect code review performance? In *28th IEEE International Symposium on Software Reliability Engineering, ISSRE 2017, Toulouse, France, October 23-26, 2017*, pages 164–169. IEEE Computer Society, 2017.
  - [37] Christia Spears Brown and Ellen A. Stone. Chapter four - gender stereotypes and discrimination: How sexism impacts development. In Stacey S. Horn, Martin D. Ruck, and Lynn S. Liben, editors, *Equity and Justice in Developmental Science: Theoretical and Methodological Issues*, volume 50 of *Advances in Child Development and Behavior*, pages 105–133. JAI, 2016.
  - [38] Louisa Smith. Working hard with gender: Gendered labour for women in male dominated occupations of manual trades and information technology (it). *Equality, diversity and inclusion: An international journal*, 2013.
  - [39] Kanchana Wijayawardena, Nilupama Wijewardena, and Ramanie Samaratunge. Compromising gender identities: Stay strategies of women in gender-atypical information technology firms in sri lanka. *IT amp; People*, 30(2):246–264, 2017.

- [40] Etlyn J Kenny and Rory Donnelly. Navigating the gender structure in information technology: How does this affect the experiences and behaviours of women? *Human Relations*, 73(3):326–350, 2020.
- [41] Alex Murphy, Ben Kelly, Kai Bergmann, Kyrylo Khaletskyy, Rory V. O’Connor, and Paul M. Clarke. Examining unequal gender distribution in software engineering. In Alastair Walker, Rory V. O’Connor, and Richard Messnarz, editors, *Systems, Software and Services Process Improvement - 26th European Conference, EuroSPI 2019, Edinburgh, UK, September 18-20, 2019, Proceedings*, volume 1060 of *Communications in Computer and Information Science*, pages 659–671. Springer, 2019.
- [42] Amanda Lee and Jeffrey C. Carver. Floss participants’ perceptions about gender and inclusiveness: a survey. In Gunter Mussbacher, Joanne M. Atlee, and Tefik Bultan, editors, *Proceedings of the 41st International Conference on Software Engineering, ICSE 2019, Montreal, QC, Canada, May 25-31, 2019*, pages 677–687. IEEE / ACM, 2019.
- [43] Monika Sieverding and Sabine C. Koch. (self-)evaluation of computer competence: How gender matters. *Computers Education*, 52(3):696–701, 2009.
- [44] Manju K. Ahuja. Women in the information technology profession: a literature review, synthesis and research agenda. *EJIS*, 11(1):20–34, 2002.
- [45] Masomeh Yeganehfar, Atefe Zarei, Ali Reza Isfandyari-Mogghadam, and AliAkbar Famil-Rouhani. Justice in technology policy: A systematic review of gender divide literature and the marginal contribution of women on ict. *Journal of Information, Communication and Ethics in Society*, 2018.
- [46] Sucharita Maji and Shikha Dixit. Gendered processes and women’s stunted career growth: An exploratory study of female software engineers. *The Qualitative Report*, 25(8):3067–3084, 2020.
- [47] Eileen M. Trauth. Odd girl out: an individual differences perspective on women in the it profession. *IT amp; People*, 15(2):98–118, 2002.
- [48] Magid Igbaria and Jack J. Baroudi. The impact of job performance evaluations on career advancement prospects: An examination of gender differences in the is workplace. *MIS Quarterly*, 19(1):107–123, 1995.
- [49] Edna Dias Canedo, Fabiana Freitas Mendes, Anderson Jefferson Cerqueira, Márcio Vinicius Okimoto, Gustavo Pinto 0001, and Rodrigo Bonifácio. Breaking one barrier at a time: how women developers cope in a men-dominated industry. In Cristiano D. Vasconcellos, Karina Girardi Roggia, Vanessa Collere, and Paulo Bousfield, editors, *SBES ’21: 35th Brazilian Symposium on Software Engineering, Joinville, Santa Catarina, Brazil, 27 September 2021 - 1 October 2021*, pages 378–387. ACM, 2021.
- [50] Josh Terrell, Andrew Kofink, Justin Middleton, Clarissa Raine, Emerson R. Murphy-Hill, Chris Parnin, and Jon Stallings. Gender differences and bias in open source: pull request acceptance of women versus men. *PeerJ Computer Science*, 3, 2017.
- [51] Erik Bihagen and Marita Ohls. The glass ceiling – where is it? women’s and men’s career prospects in the private vs. the public sector in sweden 1979–2000. *The Sociological Review*, 54(1):20–47, 2006.
- [52] David A Cotter, Joan M Hermesen, Seth Ovardia, and Reeve Vanneman. The glass ceiling effect. *Social forces*, 80(2):655–681, 2001.
- [53] United States. Federal Glass Ceiling Commission. *A solid investment: Making full use of the nation’s human capital: recommendations of the Federal Glass Ceiling Commission*. The Commission, 1995.

- [54] Colin Duncan and Wendy Loretto. Never the right age? gender and age-based discrimination in employment. *Gender, Work & Organization*, 11(1):95–115, 2004.
- [55] Jocelyn Handy and Doreen Davy. Gendered ageism: Older women’s experiences of employment agency practices. *Asia Pacific Journal of Human Resources*, 45(1):85–99, 2007.
- [56] Carolyn B. Seaman. Qualitative methods in empirical studies of software engineering. *IEEE Trans. Software Eng.*, 25(4):557–572, 1999.
- [57] Per Erik Strandberg. Ethical interviews in software engineering. In *2019 ACM/IEEE International Symposium on Empirical Software Engineering and Measurement, ESEM 2019, Porto de Galinhas, Recife, Brazil, September 19-20, 2019*, pages 1–11. IEEE, 2019.
- [58] EEOC. Age discrimination. url <https://www.eeoc.gov/age-discrimination>. accessed: 22.02.22.
- [59] Padma Subramanian. What is the average age of college graduates? url <https://collegeconomics.com/what-is-the-average-age-of-college-graduates/>. accessed: 22.02.22.
- [60] Sebastian Baltes and Paul Ralph. Sampling in software engineering research: A critical review and guidelines, 2020.
- [61] L Ceci. U.s. tiktok users by age 2021. url: “<https://www.statista.com/statistics/1095186/tiktok-us-users-age/>”, Apr 2022. accessed: 29.04.22.
- [62] Statista Research Department. Global twitter user age distribution 2021. url: “<https://www.statista.com/statistics/283119/age-distribution-of-global-twitter-users/>”, Mar 2022.
- [63] Data protection under gdpr. url: [https://europa.eu/youreurope/business/dealing-with-customers/data-protection/data-protection-gdpr/index\\_en.htm](https://europa.eu/youreurope/business/dealing-with-customers/data-protection/data-protection-gdpr/index_en.htm), Mar 2021. accessed : 29.04.22.
- [64] Saldana Johnny. *The coding manual for qualitative researchers*. SAGE, 2016.
- [65] Ann Barcomb, Dirk Riehle, and Andreas Kaufmann. A case study of episodic volunteering in floss communities-appendices. 2016.
- [66] Jakita O. Thomas, Nicole Joseph, Arian Williams, Chan’tel Crum, and Jamika Burge. Speaking truth to power: Exploring the intersectional experiences of black women in computing. In *2018 Research on Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, pages 1–8, 2018.
- [67] Tracy Camp. The incredible shrinking pipeline. *Communications of the ACM*, 40(10):103–110, 1997.
- [68] A.W. Geiger, Gretchen Livingston, and Kristen Bialik. 6 facts about u.s. moms, Jul 2020.
- [69] Youngjoo Cha. Overwork and the persistence of gender segregation in occupations. *Gender & Society*, 27(2):158–184, 2013.
- [70] Stack overflow developer survey 2020. url: <https://insights.stackoverflow.com/survey/2020developer-profile-coding-as-a-hobby-united-states-weighted-by-gender2>.
- [71] Angela Tattersall and Claire Keogh. ‘women, networking and the impact on pay, position and status in the uk ict industry’. 01 2006.



- [72] Karina Kohl Silveira, Soraia Raupp Musse, Isabel Harb Manssour, Renata Vieira, and Rafael Prikladnicki. Confidence in programming skills: gender insights from stackoverflow developers survey. In Gunter Mussbacher, Joanne M. Atlee, and Tefvik Bultan, editors, *Proceedings of the 41st International Conference on Software Engineering: Companion Proceedings, ICSE 2019, Montreal, QC, Canada, May 25-31, 2019*, pages 234–235. IEEE / ACM, 2019.
- [73] Jayne Leonard. 6 types of sexism, examples, and their impact. url:<https://www.medicalnewstoday.com/articles/types-of-sexism>, May 2021.
- [74] Shelley Correll and Lori Mackenzie. To succeed in tech, women need more visibility. *Harvard Business Review*, pages 2–6, 2016.
- [75] Mary A Lemons and Monica J Parzinger. Designing women: A qualitative study of the glass ceiling for women in technology. *SAM Advanced Management Journal*, 66(2):4, 2001.
- [76] Belle Rose Ragins, Bickley Townsend, and Mary Mattis. Gender gap in the executive suite: Ceos and female executives report on breaking the glass ceiling. *Academy of Management Perspectives*, 12(1):28–42, 1998.
- [77] Susan Vinnicombe and John Bank. *Women with attitude lessons for career management*. Routledge, 2003.
- [78] Marie Griffiths, Karenza Moore, et al. The women in it (winit) final report. *The Women in IT WINIT Final Report*, 2006.
- [79] Anja Berkelaar. Dutch women s networks—a plea for a network of networks. *Women in Management Review*, 1991.
- [80] Melissa Tyler and Laurie Cohen. Spaces that matter: Gender performativity and organizational space. *Organization studies*, 31(2):175–198, 2010.
- [81] Elizabeth H. Gorman and Julie A. Kmec. We (have to) try harder: Gender and required work effort in britain and the united states. *Gender and Society*, 21(6):828–856, 2007.
- [82] Sabine Sczesny, Sandra Spreemann, and Dagmar Stahlberg. Masculine = competent? physical appearance and sex as sources of gender-stereotypic attributions. *Swiss Journal of Psychology/Schweizerische Zeitschrift für Psychologie/Revue Suisse de Psychologie*, 65(1):15–23, 03 2006.
- [83] Alexandra Fleischmann, Monika Sieverding, Ulrike Hespenheide, Miriam Weiß, and Sabine C Koch. See feminine—think incompetent? the effects of a feminine outfit on the evaluation of women’s computer competence. *Computers & Education*, 95:63–74, 2016.
- [84] Marian White and Kate Mackenzie-Davey. Feeling valued at work? a qualitative study of corporate training consultants. *Career Development International*, 8(5):228–234, 2003.
- [85] Edeltraud Hanappi-Egger. “shall i stay or shall i go”? *Equality, Diversity and Inclusion: An International Journal*, 31(2):144–157, 2012.
- [86] Claes Wohlin, Per Runeson, Host Martin, Magnus C. Ohlsson, Regnell Bjorn, and Wesslen Anders. *Experimentation in software engineering*. Springer Berlin, 2014.

## Appendix A

# Recruitment message Screening Survey - Experience of older women and non-binary people in software development

Older women and Non-binary people have been a part of the software industry for a long time, however, little is known about their experience. This is why we would like to talk to you. We would like to hear about your experience in the software industry and we would love to learn about the strategies that you have adopted over the years. Your experience could be beneficial to women and non-binary people who recently entered the industry or to those who will enter in the future. Your strategies could help women and non-binary people remain in the industry. If you wondering or have any concerns regarding the data we collect, please take a look at our privacy policy. ([Link to privacy policy]) You do not need to sign this at this moment.

- \* required 1. What is your gender? \* -----
2. What is your age group? \* ☐ Under 25  
☐ 25 - 29  
☐ 30 - 34  
☐ 35 - 39  
☐ 40 - 44  
☐ 45 - 49  
☐ 50 - 54  
☐ 55 - 60  
☐ 60+
3. Approximately how long have you worked in the software industry? \* (please fill in as: X years Y months) -----
4. Are you currently working in the software industry? \* ☐ Yes [go to 5]  
☐ No [Go to 6]
5. Have you had any interruptions in your career in the software industry? \* ☐ Yes [Go to 7]  
☐ No [Go to 7]
6. When did you depart? \* ----- [Go to 8]
7. In which countries have you worked while working in the software industry for a period of at least six months? \* -----

*APPENDIX A. RECRUITMENT MESSAGE SCREENING SURVEY - EXPERIENCE OF OLDER WOMEN AND NON-BINARY PEOPLE IN SOFTWARE DEVELOPMENT*

---

8. Are you willing to talk to us about your personal experiences working in the software industry (the online interview will take approximately 30-60 minutes)? \* ☐ Yes [Go to 9] ☐ No [END] ☐ Maybe, I would like to know more [Go to 10]

Email information Thank you for filling out the survey. You have stated that you are willing to talk to us about your working experience. To be able to possibly schedule an interview with you we would like to have your email address. This email address will be stored but will only be used to contact you. This email address will not be shared with a third party. Your email address will be deleted once the study is finished. If you wish for your email to be removed before the end of the study please contact us at a.serebrenik@tue.nl 9. Please enter your email \* \_\_\_\_\_ [END]

Email information Thank you for filling out the survey. That you might be interested in talking to us about your working experience, however, you need more information. We would love to answer any question you have. To be able to answer your question we will need your email. This email address will be stored but will only be used to contact you. This email address will not be shared with a third party. Your email address will be deleted once the study is finished. If you wish for your email to be removed before the end of the study please contact us at a.serebrenik@tue.nl

10. Please leave your question(s) \_\_\_\_\_

11. Please enter your email \* \_\_\_\_\_ [END]

## Appendix B

### Consent form

Here we see a redacted version of the consent form. The data that was redacted is regarding to the specific Twitter thread used.

The consent form can be seen on the next page. It was place here to ensure it would fit.

# EINDHOVEN UNIVERSITY OF TECHNOLOGY

## Gender and age in software development

Version 4, last updated: 14-10-2021

### USE OF YOUR PERSONAL DATA

For us, data protection is a very important issue, so we would like to inform you how we will use your personal data and what rights you can exercise under the applicable data protection legislation, EU Regulation 2016/679 (here also: "GDPR") and Dutch privacy laws.

Any capitalized word which is not defined in this document is used in the meaning stated in GDPR. Please refer to the official text, which you can read in the following website: [EUR-Lex - 32016R0679 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/lexuri/ui.do?uri=CELEX:32016R0679:EN:EUR-Lex) If you don't understand the text of the relevant legislation and you want to understand more about this topic, please contact us at [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl).

Personal Data is every unique information about your person, regardless of the fact that your name or contact details are present. Personal Data is also, for example, an IP address, information about how you feel, the GPS coordinates of your location, information about your house, your personality evaluation, your performance assessment, your brain scan, and such.

### Who controls your personal Data?

The person who controls your data and decides how your data will be used (Data Controller) is:

The Data Controller	The Data Protection Officer (DPO)
Eindhoven University of Technology	Ms. A.H.J. (Annuska) van den Eijnden
Mathematics and Computer Science	+3140 247 6079
Point of contact: prof. dr. A. (Alexander) Serebrenik	<a href="mailto:dataprotectionofficer@tue.nl">dataprotectionofficer@tue.nl</a>
+31402473595 <a href="mailto:a.serebrenik@tue.nl">a.serebrenik@tue.nl</a>	

We obtained your data from Twitter, Microsoft Forms.

### Whose Data do we collect?

We collect data from Twitter participants, interviewees and survey participants.

### What personal data do we collect?

Depending on all the above, we collect:

<b>Contacts</b>	We collect your name, Twitter account and email address.
<b>Gender identity</b>	<ul style="list-style-type: none"> <li>We collect information about your gender identity. When collecting data from Twitter we collect this information based on the pronouns or gender-specific words (e.g., “girl”, “mom”) used in your Twitter profile or gender-specific words used in public comments [REDACTED]</li> </ul> <p>[REDACTED]</p> <p>For interviews and surveys, questions about gender identity are asked as part of the interview/survey.</p>
<b>Age</b>	<p>We collect information about your age. For the Twitter study we collect the information about age based on the public comments you have posted in the discussion thread started by [REDACTED]. For</p> <p>[REDACTED]</p> <p>For interviews and surveys, questions about gender identity are asked as part of the interview/survey.</p>
<b>Profiling Information</b>	We further collect information about the number of years in software industry and countries where you have worked in the software industry for six months or longer, as well as the experiences related to their work in the software industry.

## How do we process your data?

Below you can find a table describing how we use your data.

The use of your data is called ‘processing’ and it includes, for example: reading, storing, analyzing, sharing, and modifying your data.

For each category of information regarding you, below it is specified why we use (process) your data (the purpose), why we are authorized to do so (the legal basis), and for how long we will keep your data (retention period).

We process these data:	with the purpose to:	with the legal basis of:	storing them for:
Contact information	communicate with you for interviews and surveys	legitimate interest (Twitter) and your consent (interviews, surveys)	as long as the research project is going. We will delete information if you do not reply once we have reached saturation (to avoid the problem of re-contacting someone). We also remove contact data after publication.

Contact information	allowing you to exercise your rights	law	as long as it is required by laws and regulations
Profiling	storing, analyzing, and pseudonymizing data to answer our research questions and to perform similar research in the future	legitimate interest (Twitter) and your consent (interviews, surveys)	as long as the research project is over and for additional 10 years
All your information	anonymize your data, creating a public dataset, allowing other researchers to perform additional research in the same field	legitimate interest	the data set will be published in a research repository

## Profiling and automatic processing

The study does not involve any form of automatic decision making. Profiles are created to answer research questions. The results of this research will be made public.

## For how long is my data stored? Can I change or delete my data?

We store personal data as long as needed for the purpose described in this document, as explained in the table above.

Data related to the Twitter study, pre-screening survey and interviews can be modified, updated or deleted during the research when you ask us to do so by email to [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl). We will comply with your request promptly and at the latest within 30 days. However, please note that, after the research is performed, we might be unable to change or delete your data if this requires a disproportionate effort or if this would impair our research.

Since the broad survey (Step #4) is anonymous, we cannot remove or modify data upon your request.

If you voluntarily provide us with your email address to receive a report, your individual survey results or our research findings, your email address will be deleted after 6 months (unless you ask us to keep it for a longer time).

## Further use, sharing or disclosing

**Communication.** If you have asked to be notified of changes to our policy, to receive your individual report or to be informed about our research, we will use your email address or Twitter DM to communicate with you.

**Publication of research.** Our research results will be published and disseminated through journals, conferences, workshops, seminars, and teaching activities.

**Publication of data set/anonymized or aggregate data set.** We may disclose or use aggregated or de-identified data to enable other research group to perform further research on the same topics or in the same field.

**Change of research team members.** If students or researchers leave our team, for example because they change job, we may need to replace them. In that case, some or all your personal data may be shared or transferred to the new team members, provided that we will arrange all the appropriate security and confidentiality measures. We will ensure that the leaving persons don't have access to your data anymore.

**Performing research activities.** We may need to store your data in third-parties storage services such as SURF Research Drive, cloud solutions, or software, in order to perform our research. We will make sure that those parties arrange all appropriate security measures to protect your data.

**To protect our rights.** We have the right to disclose your data to enforce, protect and defend rights, property or safety of our group or third parties, including to enforce contracts. Please contact your attorney if you are not sure of how your national legal system allows the exercise of rights.

**To comply with laws.** We may disclose your data with our research data stewards, privacy team members, ITC support staff, and other professionals providing consultancy on research data compliance. If we receive a request for information or an inspection, we may disclose the data, if this is required by mandatory applicable laws, regulations, rules, or it is ordered by any public authority. Please check on your government website if you are not sure in what cases it is allowed by law to disclose personal data.

**With your consent.** We may share personal data and other data with third parties, such as companies involved in the research project when you gave your consent to do so.

## Where is my data transferred and stored?

As this research is being conducted by an international team we will transfer your personal data to dr. Barcomb (University of Calgary, Canada) and dr. Baltes (University of Adelaide, Australia). While these countries cannot be considered as safe as the European Union, we take the necessary precautions to protect your data.



## What are your rights?

- **Right to be informed.** You have the right to be informed about how we use your information. We do this through this document, by answering questions sent to us, and by providing reports about our research on request.
- **Right to access your data.** You may request a copy of your data by email to [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl) if you would like to know what personal data we have about you. This copy of your personal data can also be given to you in a common (machine-readable) format. Due to anonymity we cannot provide you with a copy of answers to the survey at Step #4.

**Right to rectification.** You have the right to correct inaccurate or incomplete information about yourself which you can do by email to [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl). Please note that, after the research is completed, we might be unable to change your data if this requires a disproportionate effort or if this would impair our research results. Moreover, due to anonymity answers to the survey at Step #4 cannot be rectified.

**Right to erasure.** You have the right to request deletion of your personal data, for example when it is no longer necessary for us to process the data for the purpose it was collected, or when you have withdrawn your consent, which you request by email to [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl). Please note that, after the research is completed, we might be unable to delete your data if this requires a disproportionate effort or if this would impair our research results. Moreover, due to anonymity answers to the survey at Step #4 cannot be deleted.

- **Right to restrict processing of your data.** If you believe your information is incorrect or you believe we use your data unlawfully, you have the right to ask us to stop or limit the processing, which you request by email to [a.serebrenik@tue.nl](mailto:a.serebrenik@tue.nl). Please note that, after the research is completed, we might be unable to restrict the use of your data if this requires a disproportionate effort or if this would impair our research results. Moreover, due to anonymity answers to the survey at Step #4 processing of your data cannot be limited.
- **Right to lodge a complaint.** You have the right to file a complaint with your national data protection authority, or the Dutch Data Protection Authority. Complaints to the Authority can be made at [Klacht melden bij de AP | Autoriteit Persoonsgegevens](#) or by sending written communication to the Authority for the Protection of Personal Data:

Autoriteit Persoonsgegevens  
PO Box 93374  
2509 AJ DEN HAAG  
Telephone number: (+31) - (0)70 - 888 85 00  
Fax: (+31) - (0)70 - 888 85 01  
Visiting address (only by appointment):  
Bezuidenhoutseweg 30  
2594 AV Den Haag

Further information about your rights can be found on our website at: <https://www.tue.nl/en/storage/privacy/>

These rights can be exercised in accordance with GDPR by sending an e-mail to [privacy@tue.nl](mailto:privacy@tue.nl)

### Age limit

The research is addressed to individuals who are at least eighteen years of age.

### Research Code of Conduct

We process your data in accordance with the Netherlands Code of Conduct for Research Integrity. More information can be found at [Scientific Integrity \(tue.nl\)](https://www.scientificintegrity.nl/).

### Changes to this document

If we need to make changes to the way we use your data, we will immediately contact you. If additional consent from you is required, we will ask you to sign the new document.

## CONSENT FORM

PURSUANT TO ART. 7 OF THE EU REGULATION 2016/679

I declare that I have fully understood the information provided above by Eindhoven University of Technology (the Data Controller):

Yes ☐ No ☐

I declare that I am above the age of 18

Yes ☐ No ☐

I agree to the Data Controller processing my personal data:

Yes ☐ No ☐

I agree to the collecting, storing, and analyzing gender identity:

Yes ☐ No ☐

I agree that my data are used for further research:

Yes ☐ No ☐

\_\_\_\_\_  
(Place and date)

\_\_\_\_\_  
(Signature of the person concerned)

# Appendix C

## Interview script

### 1. Demographic

**Because of the GDPR we cannot connect the screening survey to your answers in this interview. So I am quickly going to repeat some of the questions asked in there, if you are OK with this?**

- What is your gender (identity)?
- What is your age or age range? Which ever is most comfortable
- Are you currently working in software development?

[ follow-up if they are working in the industry ]

- For approximately how long have you worked in software development?

[follow-up if they are not working in the industry]

- Approximately when did you leave?
- For approximately how long did you work in software development?

### 2. View of the industry

- Can you please tell me about the positive experiences you had working in IT?
- Can you please tell me about the negative experiences you had working in IT?
- Why do you think you face these challenges ?

### 3. View of the industry (age & gender)

- Do you feel that your gender or age influences your experience in IT?
- Do you think the atmosphere at your work has a role to play in your experiences/not have your gender or age influence your experiences?
- How have you dealt with these challenges?
- Do you think you feel like you were assigned different tasks than your younger or your differently gendered colleagues throughout your career?

### 4. Feeling undervalued

- How do you feel your work has been valued in your career?

[Follow-up if undervalued]

- Could you tell me about situations you felt like that?
- How did you react in those situations?

- How long ago did this happen?
- If significantly younger than now] How do you think you would respond to a similar situation now?

5. **Feeling like leaving the field** [ask if they left the field

- You mentioned you left the field, could you tell me why?

[if they left before retirement age]

- Do you think your gender or age played a role in the decision to leave software development before reaching the retirement age?

[Follow-up if undervalued]

- Do you think the feeling of being undervalued might have played a role in you leaving?

[Ask If they are currently in the field]

- Did you ever feel like leaving IT? If so, what prompted those feelings?
- Do you think your gender or age played a role in this feeling?

[Follow-up if undervalued]

- Do you think the feeling of being undervalued might have played a role in that feeling?

[Follow-up if undervalued]

- Could you tell me why you made the switch?
- Did your age or gender play a role in the switch?
- Do you think the feeling of being undervalued might have played a role in that feeling?

6. Gender and age-specific strategies

- Have you or those around you, adopted strategies or techniques in your working life, that you think younger colleagues or differently gendered colleagues do not need to adopt?

– (ask for specific aspect if they only focus on one of them)

For all or these strategies and techniques, can you tell me:

- How old were you, approximately, when you adopted them?
- What were your goals in adopting these strategies?
- What do you think the benefits were of these strategies?
- What do you think the disadvantages were of these strategies?
- Did you continue using these strategies? If not, what led you to stop using it?

7. Existing literature

- The following strategies have been reported as being used by women in male-dominated industries. Ignoring situations, being more work oriented than family oriented, dressing differently (i.e more feminine, less feminine, make-up) and being more passive in groups. Do any of them seem familiar to you? Have you done any of these yourself, or observed others doing them?
- Research has found age-related strategies, changing appearance to look younger (i.e dying hair, make-up), change behaviours (i.e vocabular). Have you noticed anyone using these strategies or similar ones?

## Appendix D

# Code for preprocessing the interviews

```
import pathlib
import re

name = "<ADD INTERVIEWEE NAME>"
interviewer = "<ADD NAME INTERVIEWER>"

directory = pathlib.Path(__file__).parent.resolve()
path = directory / "<ADD DOCUMENT FILE NAME>"

text = ""
f = open(path, "r")

for line in f:
    line = line.replace(name, 'R: ')
    line = line.replace(interviewer, 'I: ')
    if (re.search('R: ', line) or re.search('I: ', line)):
        line = line.rstrip()
    if (re.search(r'\d\d:\d\d:\d\d.\d\d\d\d -> \d\d:\d\d:\d\d.\d\d\d\d', line)):
        text = text + " "
    else:
        text = text + line

f.close()

with open(path, 'w') as f:
    f.write(text)

print("done")
```

# Appendix E

## Codebook

Code System	Frequency
Code System	1454
Experiences	349
Pregnancy/parenthood related experiences	0
Negative	0
Discrimination/harassment	2
Excluded from after work activities due to parenthood	1
Lack of understanding from managers	5
lack of Work-life balance	2
Positive	0
Flexibility from job	2
More understanding	3
General experiences	0
Negative experiences	0
Burn outs	5
Racism	2
Related to the industry	0
High work load/overtime	2
Toxic/difficult work environment/industry	17
lack of hierarchy in industry	1
Related to the jobs/company	0
Bad managers	3
Being fired	5
Lack of reimbursement/payment	1
Positive experiences	0
Educating people	4
Related to the industry	0
Broadens the world	1
Continuously evolving	1
Nice people	4
Open to all	1
Pays well	2
Related to the type of work	0
Creating successful products	5
Enjoying the work	8
Enjoyment of problem solving/intellectually challenging	12
Related to their job/company	0
Chance to grow as engineer	7

Postive experience with the team	3
Steps to change bad work enviroment	1
Working with Smart/Nice	12
Gender based eperiences	0
Mixed	1
Negative	0
Excluded/not fitting in	21
Lack of mentorship by kin	3
Sexism	5
Ambivalent sexism	7
Benevolent sexism	24
Being perceives as not competent/technical	10
Hostile Sexism	3
Harresment	7
Institutional sexism	6
Lack of promotion	8
Underpayed	13
Internalized sexism	7
Interpersonal sexism	6
Being said to be more femine	3
Toxicity in industry	9
Transphobia	12
Unconscious biases	4
Unsafe feeling situations	1
Positive	0
In industry	0
(More) Acceptance	6
Getting oppertunities	5
Work related	0
A female boss	3
Kind colleagues	1
Mentored	5
More diversity	3
More recognition	3
Work life balance/no overtime	2
Age and/or gender based experiences	0
Negative	0
Seen as non/less technical (enough)	12
being seen as monarch/matriarch/mom	2
not being taken seriously	0
As a young woman	1
as a woman in a senior position	1
as a woman past menopause	2
Positive	0
Being a rolemodel	1
More oppertunities due to age and gender	1
Age based experiences	0
Negative	1
Considered too old	5
Fired	2
Perceived as being behind on technology	4
Perceived as being too expensive	4
Tiring to keep proving yourself	2

---

Work has become less interesting	7
Positive	1
More confident	5
People listen due to age/experience	2
Wanted by companies	6
Perception	248
Feeling towards leaving	0
Considered leaving	7
Due to age based experiences	0
Less energy to deal with things	1
Tired of where the industry is going	4
Due to gender based experiences	0
Energy waisted on fighting for a voice	2
Pregnancy	2
Struggles related to work life balance	1
atmoshere of the industry	2
Due to industry related experiences	0
Bad managers	1
Energy waisted on fighting for a voice	2
Struggles related to work life balance	1
Not considered leaving	2
Enjoys the work	6
Miss the people	2
Miss the positive atmosphere	2
More in control	1
Pays well	2
To be a good rolemodel	3
Value	55
Mixed	4
Undervalued/not valued	3
(Importance of) Work not valued	9
Be themselfe	1
Because lack of promotion/title	6
Because of pay	3
by clients/customers	1
Well valued	5
By boss	5
By clients	1
By colleagues	4
By the work produced	1
Value of the work is recognised	6
by peers	6
Current work place	6
Industry	20
Age and gender in the industry	4
Aging in the industry	8
Downward trend of women in 80s	4
Gender in the industry	29
Importance of good work enviornment/atmosphere	14
People in the industry	8
Reason people leave	6
Of self	0
Character	16

---



Looking younger	9
biases	4
Task assignment	0
Assigned differently	1
Assigned differently due to gender	14
Initial before abilities are known	1
Differently due to age	2
Same as others	6
Strategies	1
Age related strategies	0
Accepting your age	5
Be more approachable	3
Behaving younger	0
Changing way you speak/vocabulair	3
Fit in with company culture	7
Career related strategies	0
Find a niche	5
Have back up plan	5
Set boundries	1
Teaching yourself (new) tech/topics	11
Using/leverging experience as positive	9
Change appearance	28
Plastic surgery/botox	5
(Deliberately) Not trying to look younger	10
Changing hair to look younger	7
Dressing younger	2
Tailor resume	2
To appear younger	2
Changing work enviroment	6
Changing role	6
Consulting	3
Moving up the chain	3
General strategies	0
Bringing up issues	2
Changing work environment	0
Changing company	9
Ignoring situation	1
Inform others work atmosphere	2
Knowing your worth	1
Let things run their course	3
Life balance	2
Setting barriers	1
Unionize	1
Age and gender related strategies	0
Against the bias	37
Being yourself	1
Gathering Allies	13
Get coach/therapist	4
Get people to back you up	2
Knowing your worth	9
Seperating indentity from work	5
Stading up for yourself	2
Use age and gender	1

---

Career related	25
Networking	11
Take sabbatical	1
Using your influence	8
Using/leveraging experience	5
Changing work environment	34
Changing company	19
New company/entrepreneur	4
To a different company	15
Changing role	15
Consulting	4
moving up the chain	11
Creating safe spaces	2
Side projects	1
Informing others/mentoring/coaching	10
Research	2
Serve on boards	3
Speak (at conferences)	6
Teach people	3
Write books/articles/blog posts	7
Gender related strategies	0
Accept reality	4
Against gender bias strategies	0
Backing other women up	11
Don't allow for a selffulfilling prophecy	2
Don't take things personal	5
Educate others	7
Exposing biases	8
Interrupting/Dominating the conversation	3
Raising others by putting others down	1
Standing up for yourself	33
Career related strategies	0
Asking (hard) questions	7
Asking for too much to not get a job	1
Check in occasionally	1
Claim credit/give credit	9
Involving people in work	4
Micromanage	1
Negotiate for more money	3
Note accomplishments/worth you bring	10
Set boundaries	13
Show your work (step by step)	2
Using gender as leverage	2
Using leaving as leverage	2
Volunteering for tasks	4
Changing work environment	38
Changing company	7
Changing role	0
Getting a better title	1
Choose workplace based on positive/diverse environment	13
Increasing internal diversity	0
Help create opportunities	2
Help diverse hiring	9

Making consensus between workplace environment and pay	4
Switching teams	2
Changing your appearance	0
Do change their appearance	3
Dressing feminine	20
Less feminine/more gender natural	13
More feminine	7
Dressing strategically	5
Get botox/plastic surgery	1
To be memorable	2
Communication methods	20
Be precise in communication	5
Framing/minding tone	11
More straight to the point	4
Ignoring situations	21
Do ignore situations	15
Don't ignore situations	3
Strategically choosing you battles	3
Pretending to be someone else	3
Self acceptance	5
Strategies for conferences	9
Traditionally Feminine	19
Being more passive	11
Less work oriented	7
Talking yourself down	1
Traditionally Masculine	29
Be more aggressive	11
More work oriented than family	12
Taking up physical space	3
one of the boys	3
Demographic information	0
Transgender	1
Race	14
White/undefined	12
POC	1
Korean	1
Left industry at a point	2
NAtionality	14
North American	11
European	3
Made career switch	18
From consultancy to company	4
Into management	6
company	2
Into consultancy	5
Parenthood	4
Years of experience	14
45+	1
25-29	3
;18	1
40-44	2
18-24	7
Specific industry	11

OSS	1
Design	1
Specific programming language programmer	1
API development	1
Testing	2
web development/CMS	3
Video games	1
Data intelligence	1
Working in SD	0
Not working	2
Working	12
Age	14
55-59	1
60+	4
45-49	1
35-39	1
50-54	4
40-44	3
Gender	0
non-binary	1
women	13
Others	56
Later in career	18
Early career	33
Disadvantage of strategy	22
Reason for career switch	22
Benefits of strategy	19
Reason for strategy	23