

ATHABASCA UNIVERSITY

MULTIPLICITY OF “I’S” IN INTERSECTIONALITY:
WOMEN’S EXCLUSION FROM STEM MANAGEMENT IN THE
CANADIAN SPACE INDUSTRY

BY

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Approval



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Approval of Thesis

The undersigned certify that they have read the thesis entitled

**“MULTIPLICITY OF “I’s” IN INTERSECTIONALITY:
WOMEN’S EXCLUSION FROM STEM MANAGEMENT IN THE CANADIAN SPACE INDUSTRY”**

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In partial fulfillment of the requirements for the degree of

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Dedication

For my children and my husband – none of this would have been possible without your support and belief in me.

Acknowledgements

Whenever I think about space, I can't help but think about dimensions. The first three dimensions are, for the most part, known and accepted: moving up and down in space; moving front to back, or back to front; and, finally, moving across, left to right, or right to left. The final dimension, time, is for me the most fun to consider. It is, simply stated, the translation of an object through space over time. As we all move through spacetime, we bump into each other, interacting and influencing each other. This is my opportunity, finally, to reflect on my doctoral journey through this fourth dimension, and how the interactions and influences of the past will continue to influence and interact with my future. I am embracing the earliest point that I remember, in my experience of spacetime with respect to this doctoral journey, to reach out through the dimensions to acknowledge individuals who influenced, and interacted, with me and helped to bring me to this point.

I would first like to thank George Lucas and Carrie Fisher. Mr. Lucas had the courage to share his vision of what space travel would be like, influencing a little girl in 1977 to believe that she could reach for the stars. Ms. Fisher, the embodiment of the rebel Princess, led others into space to save the Universe in spite of her cisgender and her small stature. She will always be a Princess to me, one who can break out of any tight situation, including a trash compactor, in order to help others.

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Finally, I would like to thank my family for their love, patience, and support. To my father, the first Dr. Ruel, who in spite of his military/engineering training, was able to see that his eldest daughter had to go to university to earn a STEM-professional designation. I am eternally grateful to my husband, Greg, for his willingness to take on more family responsibilities while I disappeared into my virtual world of learning and writing. To my children, you would come and sit with me at the dining room table to do your homework with me while I did my research, I thank you. You each believed in me, and in my skills and abilities, even when you didn't understand what I was writing about. You made this adventure possible.

May the Force be with you all, always.

Abstract

This study focused on the question of how there are so few science, technology, engineering, and mathematics (STEM)-professional women managers in the Canadian space industry. To address this question, I examined discourses and power-relations surrounding these STEM-professional women's identities. I drew on, and reworked, the concept of anchor points, specifically asking: what is the range of anchor points associated with, and available to, STEM-professional women within the Canadian space industry? What is the relationship between select anchor points and structural (e.g., organizational rules, formative contexts), discursive (interrelated dominant ideas and practices), and socio-psychological (e.g., critical sensemaking) processes? How do these anchor points influence the exclusion of STEM-professional women from management/executive positions within this industry?

I applied the critical sensemaking (CSM) framework to mundane, everyday discourses, in order to reconstruct the STEM-professional woman's range of anchor points. This framework provided an avenue to surface the relationship between this range of anchor points, and the meta-rules, rules, and formative contexts of this industry. The CSM framework also assisted me in revealing the relationship of this range of anchor points with the STEM-professional woman's dominant ideas and practices, and her critical sensemaking processes. Analysis of the STEM-professional women's discourses, along with those of her male colleagues, brought to light not only the STEM-professional woman's intersecting identities but also, importantly, the productive and oppressive power-relations at work in this industry. In this way, I was able to showcase the 'how' of exclusion of STEM-professional women from management/executive positions.

With this empirical study, I am contributing to our understanding of how to reconstruct the multiplicities of ‘I’s’ that is the complex individual. I am also contributing to intersectionality scholarship by deconstructing the binary treatment of the ‘men-versus-women’ hidden assumptions within the relationality concept. In addition, I provide methodological clarity with respect to the CSM framework, building on previous authors’ definitions, and uses of this heuristic. This research initiative is also an important step to addressing social change within the Canadian space industry. I offer a plausible interpretation of the exclusionary day-to-day reality for STEM-professional women, and then build specific sites for micro-political resistance, targeting early career, mid, and late career initiatives, in order to effect social change in this industry.

Keywords: Intersectionality, STEM, Discourse, Discrimination, Critical Sensemaking

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List of Abbreviations

CNES	Centre national d'études spatiales
CSA	Canadian Space Agency
CSM	Critical Sensemaking
CV	Curriculum Vitae
DLR	Deutsches Zentrum für Luft- und Raumfahrt
DND	Department of National Defence
DRDC	Defence Research and Development Canada
EE	Employment Equity
ENG	Engineer
ESA	European Space Agency
EX	Executive
G7	Group of 7
G20	Group of 20
GMRD	Guided Missile Range Division
ISS	International Space Station
JAXA	Japan Aerospace Exploration Agency
JPL	Jet Propulsion Laboratory
MDA	MacDonald Dettwiler and Associates
NASA	National Aeronautics and Space Administration
OECD	Organization for Economic Co-operation and Development
SSHRC	Social Sciences and Humanities Research Council
STEM	Science, Technology, Engineering, Mathematics
UKSA	United Kingdom Space Agency
U.S.	United States

U.S.S.R. Union of Soviet Socialist Republics

WFA Work Force Adjustment

Prologue

As I sit in my room, staring up at bookcases full of my cherished Star Wars memorabilia, I consider (again) how to engage you, the reader, in my research on the Canadian space industry. I found, in the past four years of study, writing and presenting at conferences, that engagement comes from talking about me and my experiences within this industry. While this study is not about me, I am present in it. A fellow doctoral student called her thesis ‘her baby’. While I won’t go that far, I do acknowledge that ‘who I am’ and ‘who I am becoming’ along with my varied emotions - exhilaration, happiness, frustration, tears, discovery, etc. – are intertwined in every word, sentence, and paragraph of this work. I cared for, and nurtured, this work through the many drafts and revisions that eventually led to this final product, that you will read and, hopefully, engage with.

I am often asked how I came to work in space. I, to this day, remember sitting in a movie theater with my sister, anxiously waiting for the movie Star Wars to come up on the screen. This was 1977, when things like Star Destroyers, Princess Leia, and Wookies did not exist within the realm of imagination, let alone in our discourse. When this aforementioned Star Destroyer came onto the screen, I knew, at that very moment, that I wanted to be on that ship.

Today, in contrast, I am not (yet) asked why I stopped working in space. I expect that this question may be framed within feelings of incredulity on the part of the person asking the question (i.e. ‘How could you quit? You had to have the coolest job ever!’). This thesis seems to exist between these two states, of being on the inside, and then of being on the outside, of what I began to call my ‘doing space’. As such, I seem to

navigate between objective and subjective discourses throughout the writing of this thesis. The former reflects my previous life of Space Shuttles and the International Space Station, as a Life Sciences Mission Manager, where ‘I’ did not exist as a participant but as an objective deliverer of space knowledge. The latter reflects my newfound freedom, of being ‘who I am’ and ‘who I am becoming’ within an undefined context. The irony of this last statement is that I only now feel my state of freefall, which is what microgravity is all about, much more today than I ever did while ‘doing space’.

I do hope by sharing a little bit of ‘who I am’ with you, the reader, at this time, that you will see me along with the other STEM-professional women who participated in this study. The complexity of the social sometimes requires that it be broken down into its composite parts, to be examined branch by branch. I assure you that I will: guide you from these individual branches, back to the larger picture of what it is to ‘do space’ as a STEM-professional woman; and, encourage you to consider what can be done to change the systemic exclusionary social reality of this industry. So, hang on, you too have embarked on a Star Destroyer!

Chapter 1: An Introduction to this Study

I provide, in this chapter, a summary of this thesis, as a view from Earth, in order to gently introduce this complex empirical investigation into the lack of science, technology, engineering, and mathematics (STEM)-professional women in management positions in the Canadian space industry. I then move to my main argument, followed by an introduction to the research framework, broken into three branches based on context, knowledge, and experience. I then consider my methodological approach, the critical sensemaking (CSM) framework. I follow this with an overview of the significance of this research along with a summary of the chapters of this thesis. I close with a word on my personal journey, as an epilogue to this work.

Summary of Thesis: The View from Earth

In this study, I focused on the question of how there are so few STEM-professional women¹ managers in the Canadian space industry. I specifically examined workplace cisgender discourses and power-relations (Foucault, 1980, 1982, 1983), and the impact of these discourses and power-relations on these professional women's identities (Anderson, 2016; Corlett & Mavin, 2014; Mead, 1932, 1934; Watson, 2008). I drew on, and reconstructed, Glenn's (2004) concept of identity anchor points, asking:

(RQ1) What is the range of anchor points associated with, and available to, STEM-professional women within the Canadian space industry?

¹ The term 'women' and 'men' encompass the cultural, feminine and masculine (normative) cisgender-experience that is attributable to these social positions (Butler, 1990).

(RQ2) What is the relationship between selected anchor points and structural (e.g., organizational rules, formative contexts), discursive (interrelated dominant ideas and practices), and socio-psychological (e.g., critical sensemaking) processes?

(RQ3) How do these anchor points influence the exclusion of STEM-professional women from management/executive positions within this industry?

These three research questions provided guidance in surfacing organizational discourses, as represented by narratives and stories that are tangible examples of the larger context of meanings that are discourses (Saleebey, 1994). These narratives and stories were extracted from a total of ten interviews with six STEM-professional women, and four STEM-professional men who were these women's colleagues. Data consisted of unstructured interviews, and select organizational documents including annual reports, reports on equity initiatives, job competition posters, and participants' email correspondences with me.

I applied the critical sensemaking (CSM) framework (Helms Mills, Thurlow, & Mills, 2010) to these collected data. The CSM framework permitted me to analyse the discourses and the power-relations that were at work in positioning the STEM-professional woman in an exclusionary order; in other words, as the Other. In the process, I revealed the exclusionary social reality within this industry, making it possible for social change initiatives to be identified.

My Main Argument: Discourses, Power-Relations, and Identities

The vast majority of the positivist and postpositivist empirical literature on engineering and science, I found, focused on areas such as student and faculty experiences in university in engineering/technology/science fields (e.g. Hanappi-Egger, 2013), or on engineering occupational segregation (e.g. Cardador, 2017) or, interestingly, identities and (cis)gender (e.g. Faulkner, 2007). While many of these studies talked to cisgender as an identity, there were few studies that looked at social interactions, behavioural norms, or rules and social values, and social inputs into identities. In addition, the question of the occupational segregation of STEM-professional women outside of management is also rarely considered. While research has been conducted in cisgender and diversity circles focused on engineering and science (Chu, 2006; Faulkner, 2007; Hanappi-Egger, 2013; Jorgenson, 2002; Maier, 1997; e.g. Messerschmidt, 1996), many of these studies were centred on the most vulnerable, such as students. The epistemological vacuum created by focusing on the most vulnerable implies that Canadian STEM-professional women, across a spectrum of years of experience, are left to stare into the abyss, alone and unaided. The danger, as Nietzsche (1998) pointed out, is that the abyss will stare back into them.

I chose to focus on discourses and power-relations with respect to STEM-professional women's identities in an attempt to address this epistemological vacuum. Discourses were defined, in this thesis, as sets of statements and practices that bring an object/individual or set of objects/individuals into being (Parker, 1992). Power-relations, influenced by Foucault's (1980, 1982, 1983) work, were defined as existing locally in day-to-day social interactions. They are continuous, productive, and are "capillary"

(Fraser, 1989, p. 22). An individual's identity was represented by two theoretical branches of identity, namely self-identity and social-identity. Self-identity was defined as the "notion of who he/she is becoming" (Corlett & Mavin, 2014, p. 262). Social-identity, on the other hand, consisted of 'inputs' into this self-identity (Watson, 2008). These inputs were socially constructed, and manifested, in discourses via interactions with others.

The vast majority of the positivist and postpositivist empirical literature on engineering and science, within organizations, was also focused on self-identity alone. Social-identity was hinted at, such as in Chu (2006), or directly addressed under another theory umbrella, such as in social identity threat by Castro, Block, Ferraris and Roberson (2013), but was otherwise silent on this issue. This study was positioned in such a way to add to the theoretical and conceptual development of the temporary, discursive, "fluid and mobile nature of identities" (Rodriguez, Holvino, Fletcher, & Nkomo, 2016, p. 211) that were influenced by social interactions. The result was a study not on self-perception of 'who I am' (Mead, 1932, 1934); it was rather a study reflective of social interactions in such a way to focus on the outside impact on self-identity. In other words, the tales that others tell about, and the impact of, systems and processes on STEM-professional women was central to focusing on 'who I am becoming', along with 'who I am'.

I was drawn to this notion of ephemeral identities, in discourses, as I wondered about all my own possible identities, and how they interacted together, in the workplace. This idea of interaction was in line with the theoretical scholarship of intersectionality. Intersectionality, coined by Crenshaw (1989, 1991), was a way to address identity

categories (cisgender, race, class, etc.²) that are interdependent, and that constitute each other. The notion of intersecting identities was constructed as being non-additive³, and that could change through time, context, and social interactions with others (Calás, Ou, & Smircich, 2013). Empirical research conducted by Crenshaw (1989) and Collins (2000), along with many others (e.g. Calás et al., 2013; Hearn, 2014; Torres, 2012; Van Laer & Janssens, 2014), demonstrated that complex identity intersections could position individuals in society, creating an order, often referred to as discrimination, segregation, marginalization, or exclusion. The exclusion of an individual, as I applied this concept in this thesis, involved power-relations as they are enacted in the everyday, and the effects of power as they mark an individual as the Other, resulting in an ordering that limits and binds this individual (Foucault, 1982, 1983).

Calás, Smircich, and Holvino (2014) perhaps said it best, when they considered embracing intersectionality, calling us to shift our attention:

from the never-ending search and explanation of differences between men and women...to tracing how privileged [cis]gendered subjects in organizational studies, i.e. men and women managers, relate to other actors in interconnected systems of labour, which are also raced, classed, sexualized, and so on (p. 39).

² Fourteen possible identity categories were identified by Lutz (2002): race or skin color, (cis)gender, sexuality, ethnicity, class, culture, religion, age, able-bodiedness, migration or sedentariness, national belonging, geographical location, property ownership and status in terms of tradition and development. To highlight that these categories are not the central issue but that power-relations are (Cho, Crenshaw, & McCall, 2013), I only identify three categories with an 'etc.' at the end.

³ There is much debate in the cisgender and diversity literature as to whether multiple identity categories and the resultant discrimination based on these categories are additive or intersecting (see Bowleg, 2008). In line with the intersectional literature, I maintain the argument that these categories do not 'add' as independent categories because this would require a foundational assumption that each individual's experience of their identity is separate and independent.

The challenge remained, however, as to how to surface these intersecting identities, and the attendant outcome of an exclusionary order, among men and women working in an organization. Looking to narratives and stories of individuals in the workplace could become an exercise in ‘she said/he said’, which does not necessarily reflect the manifestation of intersecting identities or an exclusionary order. Power-relations among individuals must also necessarily be part of an investigation into the creation and recreation of an order, as Foucault (1977), Weick, Sutcliffe, and Obstfeld (2005), and Mills and Helms Mills (2004) demonstrated in their own respective works. Weick, in particular, focused on sensemaking processes that work hand-in-hand with power-relations. These sensemaking processes “unfold as a sequence in which people concerned with identity in the social context of other actors engage [in] ongoing circumstances from which they extract cues and make plausible sense retrospectively, while enacting more or less order into those ongoing circumstances” (Weick et al., 2005, p. 409). Critical sensemaking, building on this Weickian sensemaking, addressed some key weaknesses of Weick’s construction of sensemaking. In particular, Mills and Helms Mills (2004) folded “such issues as structure, power, [cis]gender, class, and race” (Kindle location 3302) into our understanding, and application, of socio-psychological processes when studying social interactions within a specific context.

In addition to folding in power-relations and critical sensemaking into the study of intersecting identities, the concept of identity anchor points (Glenn, 2004) was needed to address the challenge of applying intersectionality empirically. The term identity anchor point was reconstructed in this thesis, from its original usage provided by Glenn (2004), where anchor points represented intersecting identity categories that are discursively

created and recreated. Anchor points are not just identity categories, however; anchor points encompass the act of their creation via discourses, the power-relations among individuals, and critical sensemaking processes. For example, someone may identify a Black woman who is dependent financially on her partner as one possible anchor point. This anchor point highlights the intersection of race, cisgender, and the socio-economic status of a class. This same person for whom someone discursively created an anchor point – a financially-dependent Black woman – has empirically been shown to be treated differently than a White woman or a Black man within a legislative context (Crenshaw, 1991). Anchor points can then assist us in revealing the order that can be created and recreated through this meaning-making process.

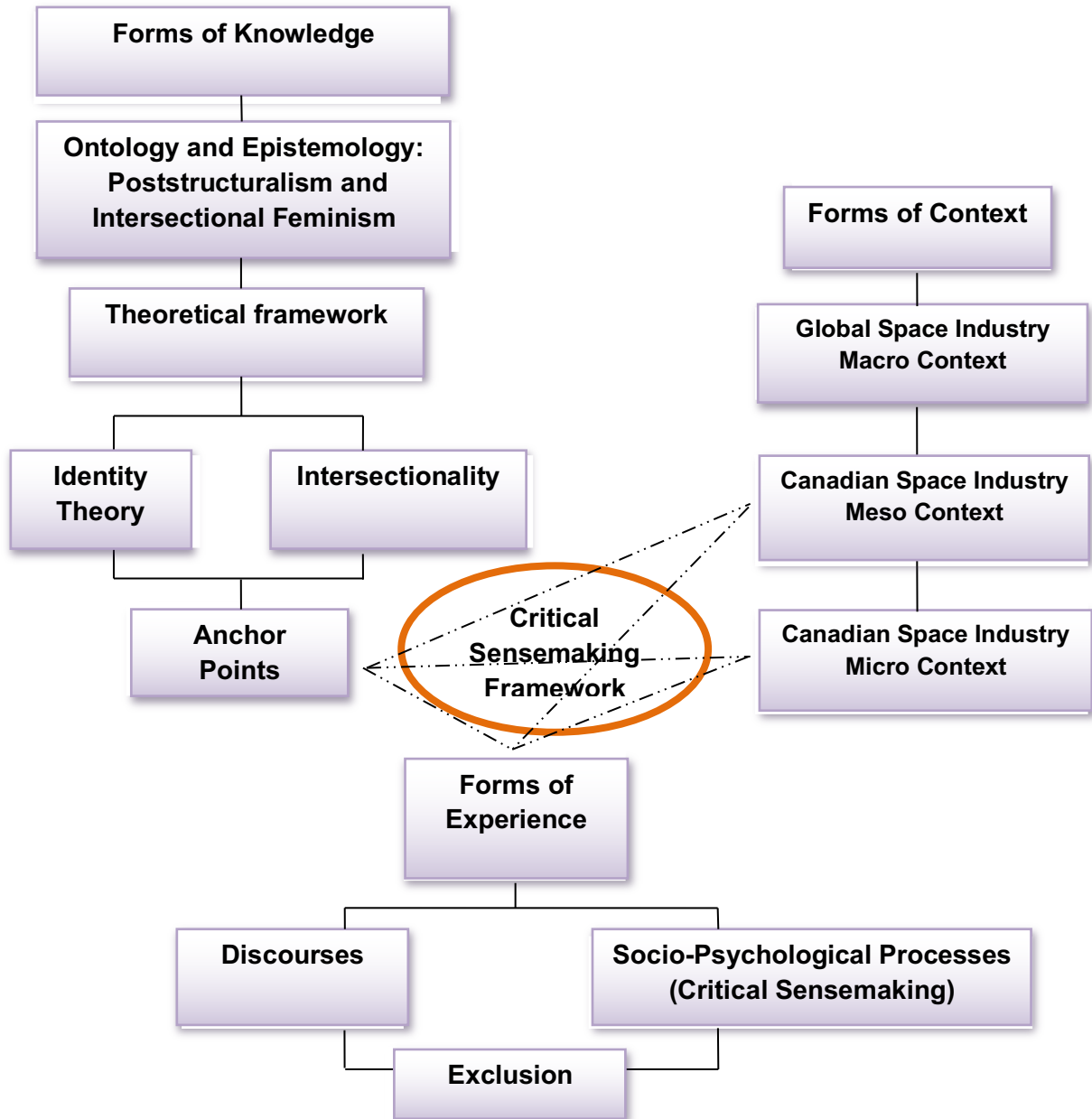
The relationship between an individual's range of anchor points with context, represented via rules, meta-rules, and social values (Mills & Murgatroyd, 1991; Unger, 1987a, 1987b), added an important branch to this complex study of exclusion. My reasoning for embracing context in this way was founded on recreating subjective experiences, and interpreting those experiences within a context, as a way to open up a new space for discussing how to effect change within that context. While some (e.g. John Stuart Mill) may argue that such a study may lead to 'truth', this act of opening up a space to critically examine a complex social reality via a study of discourses, power-relations, and critical sensemaking within a context of rules, meta-rules, and social values, does not lead to such 'truth'. It does lead to many transient subjective 'truths', that can be illuminated, much like a prism of light that reflects many different representations of the colour spectrum against a white wall.

To untangle this prism of light, I necessarily needed a research framework that could sustain such an endeavour. There was an important interaction occurring across all these concepts which I grouped across notions of context (i.e. meta-rules, rules, and social values), of knowledge (i.e. intersectionality, anchor points), and experiences (i.e. discourses, critical sensemaking, exclusion). I turn now to the presentation of the research framework for this study.

Research Framework: Forms of Knowledge, of Context, and of Experiences

The theoretical framework for this research was premised on finding the range of anchor points that were attributed to STEM-professional women, and how this range came into being and were reproduced, along with the range's relationship to rules, meta-rules, and social values, and the discursive and socio-psychological processes of individuals within the Canadian space industry. The conceptual framework is represented graphically in Figure 1.

Figure 1: Research Framework



Forms (context, knowledge, experience) were used in a Foucauldian sense.

Specifically, Foucault's forms relied on deconstructing Marx's social 'forms' that were centered on the self-understood and the 'natural' social life (Marsden, 1997). Forms

were, to Foucault, historical social constructs fashioned as objects of knowledge, and as targets of institutional practices (Marsden, 1997). Foucault's forms of knowledge were concerned with, for example, psychiatry or medicine, not as a self-understood social life, but as a point to problematize the relationship between psychiatry (a form of knowledge) and madness (a form of experience). My concern mirrored Foucault's in that I wanted to problematize the relationship between the Canadian space industry's rules, meta-rules and social values (forms of context), an individual's range of anchor points based on intersectionality scholarship (forms of knowledge), and the experiences of discourses, critical sensemaking, and the exclusion of individuals (forms of experience).

To be able to study these three forms, certain theoretical frameworks were used to help focus my understanding of each of these constructs. Notably, the forms of context were based on Mills and Murgatroyd's (1991) understanding of rules and meta-rules, and on Unger's (1987b, 1987a) notion of formative contexts (i.e. social values). As such, the micro study of rules, meta-rules, and social values of the Canadian space industry were considered following a closer look at the macro and the meso space contexts, via an examination of both practitioner and academic literatures. As for forms of knowledge, I embraced, from the academic literature, poststructuralism and intersectional feminism along with a theoretical positioning focused on identity and intersectionality. Finally, with respect to forms of experience, these were built from the academic literature's understanding of discourses, critical sensemaking, and exclusion experiences.

These three forms – context, knowledge, and experience - directly reflected the three research questions presented earlier. By approaching the lack of STEM-professional women in management in this way, I was able to untangle the dominant, and the

mundane, discourses and power-relations in such a way to reveal the exclusionary order in this industry. The CSM framework, also represented in Figure 1, sits in the middle of the theoretical framework, highlighting that the analysis was done across the three forms. The CSM framework helped me to analyze the relationship between anchor points, the Canadian space industry context of rules, meta-rules and social values, and the discourses, the critical sensemaking processes, and the experience of exclusion for these STEM-professional women.

With this research framework in mind, I now briefly consider the Canadian space industry, within the forms of context. I follow with a summary of the forms of knowledge, introducing poststructuralism, intersectional feminism, and intersectionality. I then move to forms of experience, touching on the concepts of discourses, critical sensemaking, and exclusion.

Forms of Context: The Demographics of the Canadian Space Industry

The space industry, as we know it today, was born after World War II (De Groot, 2006). Engineering and scientific practice morphed from a war effort to one of government-academic-private space industry alliances, where science and mathematics were stressed for achieving technological advancement and commercial enterprise (Lang, Cruse, McVey, & McMasters, 1999). The race to the moon, following World War II, was primarily run by two global entities, the United States (U.S.) and the Union of Soviet Socialist Republics (U.S.S.R.). The Canadian space industry was brought to the attention of the world, during this race to the moon, with the U.S.-provided launch of the Canadian-designed, and built, Alouette satellite in 1962 (Canadian Space Agency [CSA], 2012a). This satellite was constructed and operated via a military government

department, Defence and Research Telecommunications Establishment, and a mix of private companies including RCA, and Spar Aerospace Limited. The launch of the Alouette heralded the arrival of Canada as a key player in the burgeoning global space industry. This industry grew and evolved from a largely military operation, into a global capitalist one with multiple stakeholders spanning many different foci, including research and development, manufacturing, and operations.

The Canadian arm of this capitalist space industry generated, in 2012, revenues totalling \$3.32B (CSA, 2013). The Canadian space industry, a mix of private and public companies, is recognised for its strengths in such areas as satellite-based communications, earth observation, and space robotics (Aerospace Industries Association of Canada [AIAC], 2015). To be able to achieve such capitalist-based successes, a diversity of individuals fulfils various occupational roles in this industry. These roles include the scientific/technical/ engineering professions and extend to the administrative/corporate professions. Profession was treated in this study not just from an accreditation and university-trained perspective but also from a historical and cisgender perspective (Witz, 1992). There were, specifically, 7,993 individuals working in the Canadian space industry in 2012, where 2,932 were engineers, scientists, and technicians (CSA, 2013). There were also 671 managers working in this industry (CSA, 2013).

The problem that I set out to reveal was hidden in these statistics. Specifically, the demographic representation of STEM-professional women in management positions, in the Canadian space industry, was less than 20% in 2012 (CSA, 2012b; Catalyst, 2013).

White⁴, military-trained, and/or engineering-trained men predominantly occupied the STEM management/executive professions in this industry. Canadian STEM-professional women were, and continue to be, relegated into supporting technical and/or administrative, corporate roles in this industry. In Chapter Two, I elaborate on this demographic reality by focusing on two key stakeholders, the CSA, and MacDonald Dettwiler and Associates (MDA).

In order to empirically reveal this order, and what it means for STEM-professional women to work in such an order, I had to move beyond demographics, and focus on the everyday social interactions among individuals who work in this industry. To be able to study these social interactions, I embraced the poststructural lens which I now turn to.

Forms of Knowledge: Poststructuralism, Intersectional Feminism, and Intersectionality

The poststructuralist lens compelled me to be concerned with “the relationship between human beings, the world, and the practice of making and reproducing meanings” (Belsey, 2002, p. 5). This relationship can be studied by considering a subject’s “contextualization of experience” (Weedon, 1997, p. 121). Although I refer extensively to an ‘individual’ in this study, the idea of a subject is a cornerstone⁵ in philosophy and, as such, in poststructuralism. The subject was defined, most clearly for me, by Weedon (1997) as:

⁴ I need to recognize the socio-political characterizations of race, cisgender, class, etc., that are produced through discursive processes (Acker, 2006; Crenshaw, 1991; Weeks, 1989) in spite of Lykke’s (2014b) “passionate disidentifications” (p. 30) efforts. To that end, I capitalize the term ‘White’ to reflect the notion of “cultural allegiances” (Ladson-Billings, 1998, p. 9).

⁵ Note that it is the idea that has been at the center of debates between modern and postmodern treatments of the subject. In a postmodern treatment, the subject is decentered such that a focus on discourses, rules, and power-relations becomes central (Levy, 2001).

socially constructed in discursive practices... [and she] exists as a thinking, feeling subject and social agent, capable of resistance and innovations produced out of the clash between contradictory subject positions and practices (p. 121).

This subject generates and interprets dominant ideas in discourses, and in power-relations of the every day, and is similarly create by these discourses. This *régime des pratiques* (system of practices) (Perrot, 1980), based on Foucault's work after *Discipline and Punish*⁶ (Foucault, 1977), was fundamental to the exposure of Foucault's multifaceted subject, and to the power-relations that were at play in day-to-day interactions. This subject was also capable of reflecting on, and resisting, these dominant ideas, ultimately being able to make sense of her social reality, and of making choices, among the various options open to her (Weedon, 1997). Foucault's system of practices, based on his technology of the self, of power-relations, and of discourses (Foucault, 1980, 1988a, 1988b; Perrot, 1980), will be considered in further detail in Chapter Three.

Poststructuralists are ontologically concerned with "the notion that the individual creates the world in which he [*sic*] lives" (Burrell & Morgan, 1979, p. 279). As such, I was less concerned with finding universal 'truth' in the individual's creation and recreation of the social. I was more concerned with finding a set of fragmented legitimized errors as 'truths' that were discursively situated (Eriksson & Kovalainen, 2012; Foucault, 1977). These fragmented, and discursively-situated, 'truths' could assist me in clarifying meanings such that there were sites for resistance, and for

⁶ The focus of Foucault's work, after *Discipline and Punish*, is on a "'normal' individual [who] is subjected to a regime of power/knowledge" (Levy, 2001, p. 89), and so his breadth of work after this point lined up with the intent of this research.

transformation, leading to (eventually) an individual's independence (Alvesson & Willmott, 1992; Weedon, 1997). In approaching these fragmented 'truths' in this way, I was expanding our understanding of the self, and of resistance, much as Thomas and Davies (2005) did in their study focused on theorizing resistance.

When it came to the question of exclusion of women, positivists' attempts to address this have had limited success as Hearn and Parkin (1983) pointed out. Notably, the functionalist streams of research tend to address questions of 'what' and 'how many?' while ignoring issues of 'why' and 'how'. Examining discrimination, or exclusion, of women required a movement away from these positivist types of questions. To this end, my epistemological search for knowledge was based on 'how' questions with respect to the exclusion of STEM-professional women. In this way, I could effect change in the Canadian space industry, with an attention to the production of subject positions, modes of femininity and masculinity, and micro-political resistances (Davies & Thomas, 2004; Weedon, 1997).

Furthermore, research addressing the 'why' and 'how' type of questions, when it comes to women, tend to be captured within various feminisms. bell hooks, an academic focused on critical race theory, gave possibly the most succinct definition of feminism I have read so far. She stated that "feminism is a movement to end sexism, sexist exploitation, and oppression" (hooks, 2013, p. 13). Feminisms tend to be categorized along liberal, radical, second-wave, third-wave, or postcolonial feminism groupings (Calás & Smircich, 2006). Given these different types of feminism, I found myself struggling to locate where my feminist epistemological beliefs rested, in view of my search for political insights into the lack of STEM-professional women in management

positions. Returning to my ontological stance, I believed that the interdependent cisgender, raced, classed, etc., discursively created and recreated social reality of an individual must necessarily be part of a search for knowledge. I found, however, that these various feminisms did not allow me to consider the interdependence of the “multiple axes of oppression” (Lépinard, 2014, p. 877) of the lived reality of women. Similarly, while poststructural feminism is grounded in discourses, the search for the multiplicities of ‘truths’, and the political micro-resistances, this lens did not necessarily focus on the interdependence of cisgender, ethnic/raced, classed individuals.

Intersectional feminism, recently defined by McKibbin, Duncan, Hamilton, Humphreys, and Kellett (2015), was grounded in a poststructural ontology, and it embraced women’s discursive experiences. It also specifically considered the political nature of the lived, interdependent, constituting experiences of women and their identities. Studying a privileged cisgender individual (STEM-professional women) and their relationship to others (STEM-professional men) within interconnected systems (Canadian space industry which was cisgender, sexualized, raced, classed, etc.) was no longer ‘just’ an issue of studying the oppositions of men versus women. This intersectional feminism perspective provided me with an ontological and epistemological vehicle in which to create knowledge based on discourses and power-relations and, most importantly, on the complex creation and recreation of individuals within the systems and processes of an industry.

Intersectionality and anchor points.

As I presented in the beginning of this chapter, intersectionality is the study of intersecting, interdependent, constituting identities, and the resultant order that is

(re)created (Crenshaw, 1989, 1991; Davis, 2014; McCall, 2005). Intersectionality scholarship specifically takes into account the positioning (i.e. discrimination, marginalization, oppression, exclusion) of an individual based on these interdependent and constituting identities (Crenshaw, 1989, 1991). Stating someone's identities – White, Black, Korean, woman, man - does not reveal the social order that may result, however. Exclusion and/or discrimination is not an experience that can be broken down into its individual identity elements either (Lépinard, 2014). Intersectionality attempts to bring identity categories, that are enmeshed together, with discrimination in such a way to explain a social order.

How to address and represent interdependent identities, and the accompanying experience, is difficult. Some authors stay close to the roots of intersectionality scholarship, focusing on the cultural and social determinism of the Black woman, as the theoretical wedge, into studies that, in the past, focused on women as an essentialized being (e.g. Levine-Rasky, 2011; Nash, 2008; Torres, 2012). Other scholars moved to different positions of oppression, such as working class Latino feminists, and physically disabled Americans (Hurtado & Sinha, 2008; Thomson, 1997) as the theoretical wedge. However, the complex creation and recreation of an individual cannot be an exercise in determining how many demographic identities, or standpoints, a person has. Revealing a complex cisgender individual is, I believe, an exercise in investigating the interdependent discursive experiences of individuals who are interacting together and, perhaps most importantly, the impact of those discourses.

To reveal such a complex individual and a social order, the reworked anchor point concept was used. The Glenn (2004) anchor point concept was based on her

interpretation of relationality whereby, for example, ‘Black’ and ‘woman’ as identities gained meaning in relation to each other. She constructed the anchor point as being in hierarchal opposition: so, White was the dominant category over Black, and Man was cisgender-less in contrast to Woman. Furthermore, this relationality included occupational identities that an individual may have. Creating an anchor point, according to Glenn, secured meaning so that we could consider the order that was created and recreated through this meaning. These Glenn anchor points became the theoretical wedge(s), as opposed to the Black Woman, who was the historical theoretical wedge within critical race theory.

I did not continue with this Glenn (2004) notion of relationality. I found that Glenn’s interpretation of relationality was counter to the foundational idea of the non-additive nature of identity categories. Specifically, by reconstructing the anchor point concept, I was no longer looking to problematize a White or a man as dominant categories as an ‘accusation’, as Glenn did. I set out to problematize the power-relations, and the discourses, that created and recreated the complex individual, based on interdependent and constituting identities that were non-additive and ephemeral. I now present my act of reflexivity to demonstrate one possible range of these ephemeral anchor points, and how they can be used to represent a complex individual, and their experiences of being Othered.

First “I” in intersectionality: My range of anchor points.

I was⁷ a highly-educated STEM-professional, French-Canadian⁸, White, mother, woman. I was also a public servant working within the Canadian space industry when I wrote the first (and many subsequent) drafts of this thesis. I freely acknowledge that I adopted discursive practices and processes that reflected norms and values of this industry, sometimes without realizing I had done so. I was someone who was enclosed, partitioned and ranked (Marsden, 1997) within the Canadian space industry as a Life Sciences Mission Manager. I was the only Canadian woman in this occupational role that led and managed scientific, operational life sciences missions into space.

I was someone who was able to discursively and behaviourally play the ‘I am different than you– I am the same as you’ web of games⁹ when needed. The social-identity - Life Sciences Mission Manager - highlighted for me this web of games as not only a cisgender Life Scientist but also underscored the sacrifices I made with respect to ‘who I am’ or, my self-identity. The experiences I was party to, and subjected to, contributed to my sense of ‘fit’ into/with the dominant group of White, STEM-professional men. For example, when challenged in a meeting to an arm wrestle by a colleague, to resolve a contentious work-related disagreement, I obliged; or, when asked to get coffee by a visiting European dignitary man, I let another White, STEM-professional man identify my work enclosure; or, when told that it was great to have a woman at the table, to act as the nurturing and caring voice, I did my best to assume this

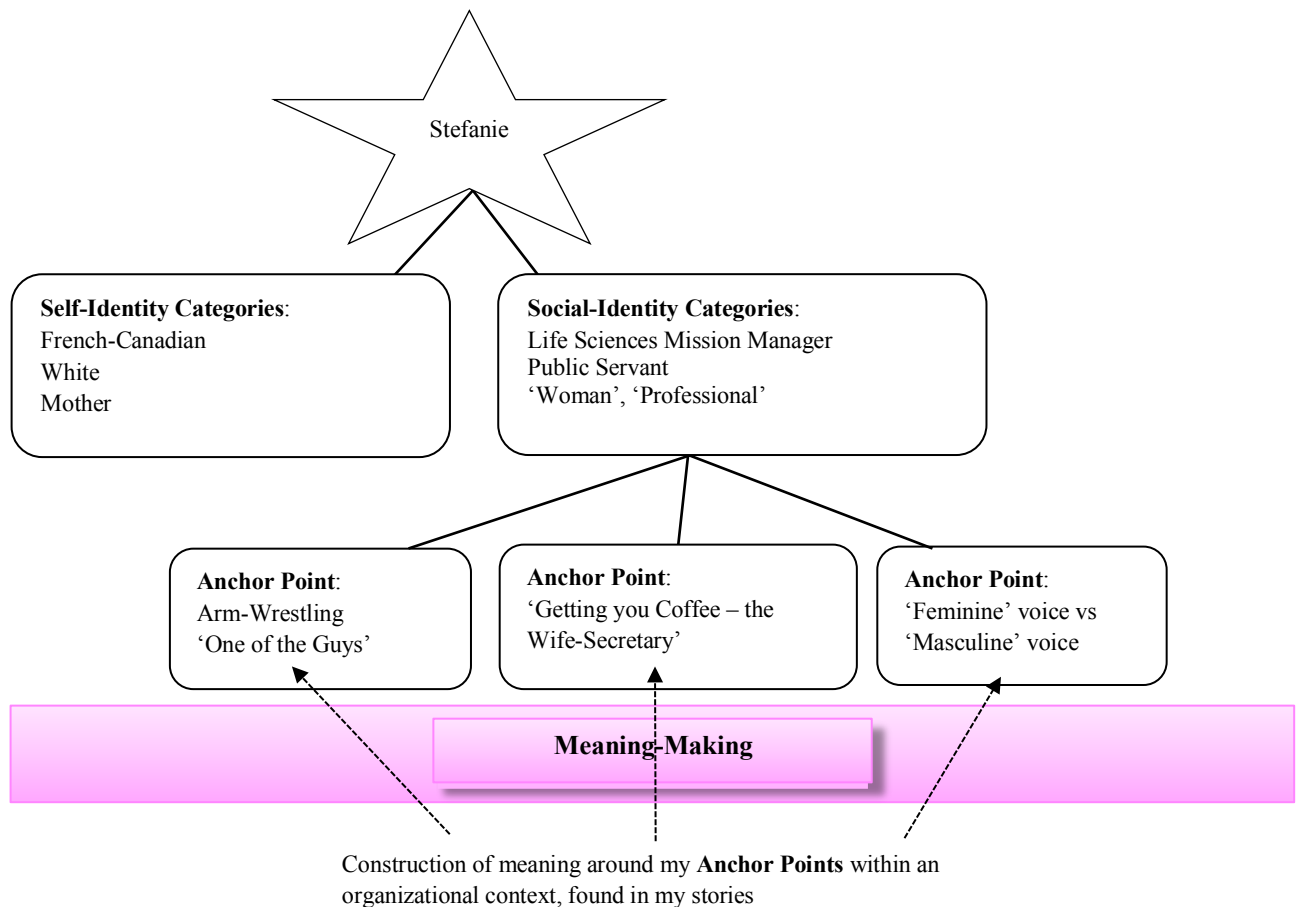
⁷ While I ‘am’, I must also reflect the historical self-identities of ‘who I was’. To capture this historical perspective, I use the past tense in my sentence constructions in this section.

⁸ Pavlenko (2001) argues for the inclusion of bilingualism (in my case, French-English) since cisgender, and I would add any identity, is constructed and negotiated in discourses.

⁹ Inspired from Lyotard’s (1991) “language games” (p. 10), and from Calás and Smircich’s (1999) “webs of power/knowledge” (p. 660).

temporary (cisgender) anchor point. Summarizing these stories, I present, in Figure 2, my self- and social-identities along with a plausible range of anchor points.

Figure 2: My Possible Range of Anchor Points



We could spend some time analysing my unique/token status, and the attempts to assimilate/exclude me, within the homogenous dominant group of White men I worked with. However, the idea behind this example was not to rationalize ideologies that were at play in my particular case. Nor was the idea of this example to focus on the opposition of the single identity categories of men versus women, or White versus non-White. This study was about bringing forth STEM-professional women created and recreated anchor

points, within a particular organization, in such a way to reveal, and problematize, the exclusionary social order. My possible range of anchor points was shared to engage the reader in an understanding of fleeting/changing/fluid anchor points, and of intersectionality, given that these two concepts can be challenging to understand. What is interesting with this plausible range of anchor points and my ordered experiences, is that at times I would be considered ‘one of the guys’, requiring that I push aside my cisgender feminine side, and then at other times, I could be mistaken for the ‘wife-secretary’, or the nurturing, caring feminine subject. This range then highlights some of the discourses and power-relations at work in my particular case.

Given this overview of forms of knowledge, I now consider the next form, focused on experiences.

Forms of Experience: Discourses, Critical Sensemaking, and Exclusion

The final forms of experience provided a site where I could problematize the relationship between anchor points (a form of knowledge), and discourses, critical sensemaking processes, and exclusion. Discourses, represented by narratives and stories, were introduced earlier. Similarly introduced earlier, an individual’s critical sensemaking processes, applied to these stories and narratives, provided a way to shine a light on how an individual can be created and recreated. Exclusion as an experience was built on an argument around social division, identity categories, and an individual’s subjective experience of their daily life, as defined by Yuval-Davis (2006). She broke exclusion down to its very basic element, namely ‘normalcy’, where “determining what is ‘normal’ and what is not, who is entitled to certain resources and who is not” (Yuval-Davis, 2006, p. 199). Cisgender, race, ethnicity, class, age, able-bodiedness, etc., are all identity

categories that are discursively created, and recreated, that can divide individuals among two groupings: ‘us’ and ‘them’. What is key to the arguments of ‘us’ and ‘them’ is that there are critical elements of cultural, political, and historical influences on social divisions that must be accounted for and recognized. This accounting necessitates a recognition of power-relations in the creation and recreation of social divisions above and beyond a simple listing of identity categories, and how many individuals are, or may be, affected (Yuval-Davis, 2006).

This understanding of exclusion, and the study of stories and narratives, and the accompanying critical sensemaking of these vehicles of discourse, provided an avenue for studying the creation and recreation of the Other, within a particular organization. This is why, in Figure 1, I linked these three experiences to each other, and not necessarily flowing linearly, one after the other. In this way, I could easily start with studying exclusion, and then tease apart discourses and critical sensemaking. This final branch of the research framework acted as a way to highlight the interaction of the complex social interactions, and the experience of those social interactions.

Research Methodology: Critical Sensemaking Framework

Helms Mills, Thurlow and Mills’ (2010) critical sensemaking (CSM) framework provided me with an avenue to answer the three research questions, introduced earlier. CSM was constructed from four heuristics interacting together. The framework was specifically shaped from Foucault’s (1978, 1980) discourses, Mills and Murgatroyd’s (1991) organisational rules, Unger’s (1987a, 1987b) formative contexts, and Weick’s (1995) sensemaking. Interaction was the key idea; there was no structural or procedural

step-function among sensemaking, discourses, rules and meta-rules, and formative contexts.

Foucault's concept of discourse, as presented earlier, was a critical lens that opened a door to look to issues surrounding power-relations (McHoul & Grace, 2007). Fundamentally, social realities cannot be understood without investigating those discourses that were practiced in that reality (Phillips & Hardy, 2002). Mills and Murgatroyd's (1991) treatment of institutional rules and meta-rules worked in concert with Unger's (1987a, 1987b) formative contexts in an effort to bring to light a view into familiar solutions that individuals use and apply. Rules and meta-rules functioned as a pre-existing framework determining how 'things get done' (Mills & Murgatroyd, 1991). Formative contexts, on the other hand, captured and reflected dominant social assumptions (Unger, 1987b), and "provide an implicit model of how social life should be led" (Blackler, 1992, p. 283). Formative contexts could also be referred to as social values, generated and reproduced by a privileged few within a particular culture (Blackler, 1992).

The notion of critical sensemaking of discourses centred on identities, was the final piece of the heuristic puzzle. Weickian sensemaking provided assistance in studying agency¹⁰, via a study of social-psychological processes broken into seven component properties. Critical sensemaking folded into the heuristic "such issues as structure, power,

¹⁰ Reference to agency, within Weickian sensemaking, is appropriately used here (Maitlis & Christianson, 2014). However, as this research initiative is a poststructuralist work, I must highlight that this agency concept with its three components (that is, intentionality, power as an entity, and rationality) does not apply here since the social is discursively created and recreated. This implies that the sense of self is fragmented and thus no individual could have a consistent set of intentions, one of the foundational ideas behind agency.

gender, class, and race” (Mills & Helms Mills, 2004, Kindle location 3302) thereby allowing me to study exclusion, and the how of resistance.

Significance of this Research

I recognized that it was important for me, and for my colleagues who worked in the Canadian space industry, to meld my status reflexively into this work such that I could initiate some “forms of resistance against different forms of power [relations] as a starting point” (Foucault, 1982, p. 780). This idea of resistance resulted in an "open, more-or-less coordinated cluster of relations" (Foucault, 1980, p. 199) that I had to bring forward such that I could plausibly recreate a social reality along with providing a plausible set of solutions, to effect social change. I could, in other words, be the catalyst of disruption. I offered, in this work, what was hidden beyond a traditional binary explanation of ‘men versus women’. I consciously chose to intervene, with a view to altering an order.

With these ideas in mind, I am making four specific contributions with this thesis: to the literature, to theory, to methodology, and to social change. These four areas are extensively presented in Chapter Nine. Briefly, this research contributes to expanding our empirical intersectional understanding of the exclusion of privileged individuals (Nash, 2008). This research also contributes to a clearer understanding of the anchor point concept and its application beyond the binary relationality concept. It also moves us beyond the utilitarian/functional and equality diversity definitions, and their application (Simons & Rowland, 2011). The empirical application of the CSM framework expands our understanding of this methodology, and how to apply this heuristic. Finally, this research contributes to effecting change for STEM-professional women, in the Canadian

space industry, by suggesting initiatives framed within micro-political resistances (Davies & Thomas, 2004).

Outline of Dissertation Chapters

This thesis consists of nine chapters, the first being this introduction. I introduced in this chapter the main argument, the theoretical and methodological framework for this study. I also briefly introduced the significance of this research.

Chapter Two was focused on forms of context, and was divided into two sections. The first section presented an academic and practitioner literature review of the global (macro), the organizational (meso), and the personnel (micro) Canadian space industry. The second section of this chapter, building on literature presented in the first section, submitted the first branch of the research framework focused on the organizational rules, meta-rules, and formative contexts.

Chapter Three was similarly divided into two sections, focused on presenting the paradigmatic and theoretical positioning, building on an academic literature review. The first section begins with a literature review of feminisms, and why sub-branches of feminisms are left wanting for this study. This was followed by the literature on poststructuralism, and on building a genealogy for intersectionality, based on Foucault's technologies of self, of power-relations, and of knowledge/discourses. I then moved to the literature on intersectionality and identity, focusing on what has been said, and what is missing. The second section builds on the first section in order to define the next branch of the framework, forms of knowledge.

Chapter Four focused on the final research framework branch, forms of experience. A literature review focused on discursive and critical sensemaking processes, and on systems and processes of domination/exclusion was presented. The second section of this chapter presents the third branch of the framework.

Chapter Five presented the research design for this study. The second and third “I” of intersectionality, namely recruiting participants and data collection, and how I recreated the participants via a map of identities, were then presented. An explanation of the critical sensemaking framework followed. I close out this chapter with a summary of the participants for this study.

The results of the analysis were spread across three chapters, Chapter Six, Seven, and Eight. In these chapters, the STEM-professional woman’s range of anchor points, the relationship between the STEM-professional woman’s range of anchor points and forms of context, and forms of experience, were analyzed. Chapter Eight addressed the issue of micro-political resistances (Davies & Thomas, 2004) to effect social change within the Canadian space industry.

Chapter Nine, the concluding chapter, presented the research contributions. Limitations of the study, and implications for future research, were also presented in this chapter. The final word is left to me, as an epilogue to this thesis.

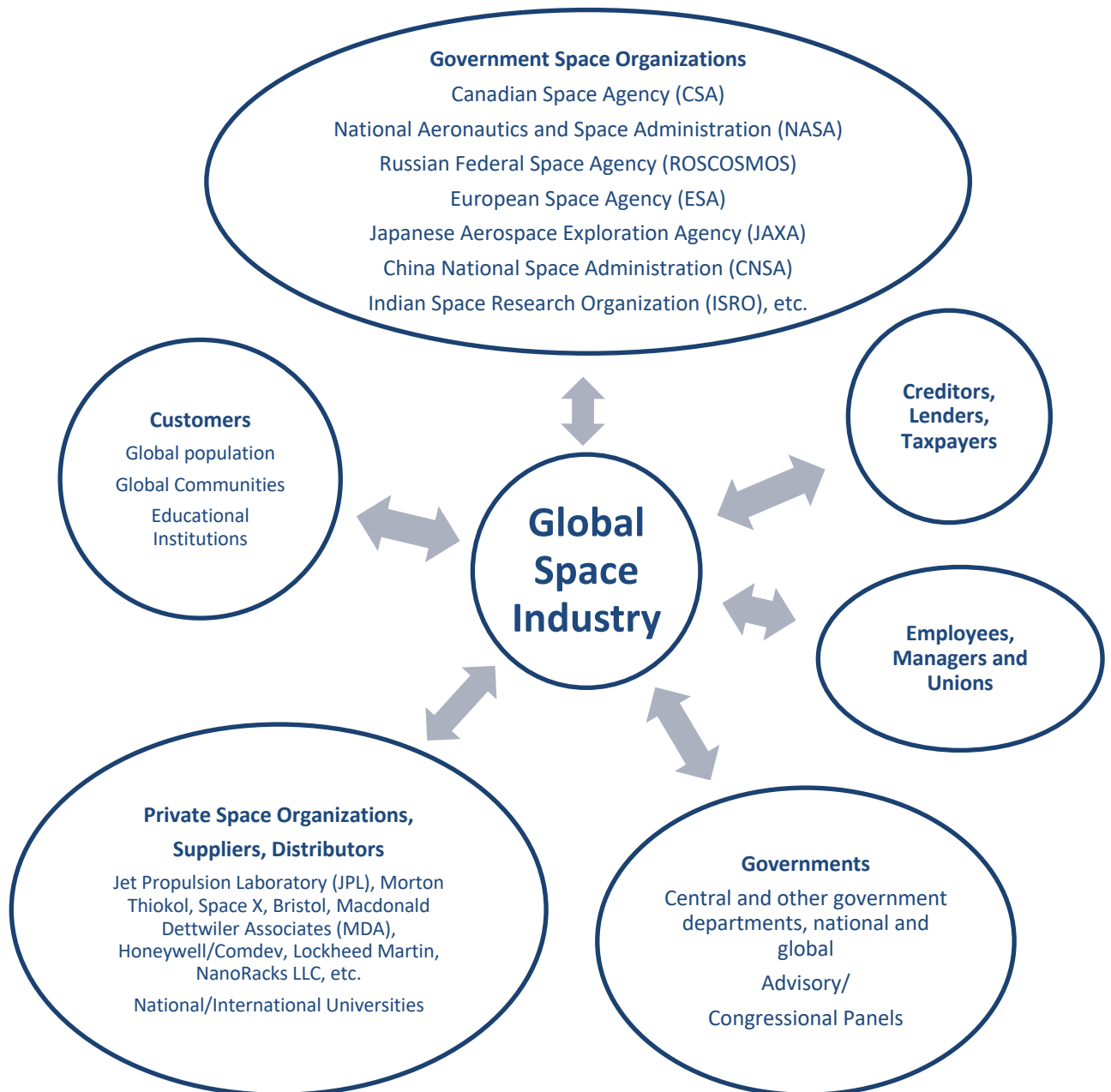
Chapter 2: Forms of Context

This chapter begins by reviewing literature focused on the macro global space industry, the meso Canadian space institutions, and the micro demographics within the Canadian space industry. In showcasing the Canadian space industry in this way, I am highlighting the influence of the global space industry, and some of the meta-rules, rules, and formative contexts of the Canadian space industry. I also consider the academic literature on engineering and science professions as a broad influence on the Canadian and global space industry's meta-rules, rules, and formative contexts.

Meta-rules, rules and formative contexts will be presented and discussed in the second section of this chapter. In the interim, I provide the reader with high-level definitions to these concepts. Meta-rules, as I used the concept in this thesis, are “rules that produce other rules” (Jolivet & Navarre, 1996, p. 266). Rules impose order in organizations, and they can be formal or informal, written or unwritten, policy driven or ethically/morally driven (Helms Mills & Mills, 2000). Meta-rules and rules, as Brown (1998) pointed out, “offers an explanation of common action” (p. 9). This is not to say that inconsistencies and ambiguities are not part of this ‘common action’; meta-rules and rules can provide a coherent experience for individuals across the global space industry, in spite of the ambiguities that can exist in the day-to-day, social practices that are at play. Formative contexts are essentially social practices and social values (Unger, 1987b). These meta-rules and rules, along with social practices and values, can set boundaries on individuals.

The Macro: Global Space Industry

As introduced in Chapter One, the space industry was born after World War II in the form of a race to the moon between the U.S. and the U.S.S.R. The space industry has grown since this time, into a global, capitalist business, involving multiple types of stakeholders. Some of the global capitalist space industrial sectors now include: satellite communications and navigation systems; robotics; space vehicles; Earth observation; space exploration; and, most recently, space tourism. A conceptual map of the contemporary global space industry's stakeholders is presented in Figure 3.

Figure 3: Global Space Industry Stakeholders

Narrowing my focus to the Group of Seven (G7)¹¹ and to Russian space interests, these stakeholders must share resources given the magnitude of the technical, safety, and capital-cost risks associated with space and its exploration. It is important to underline that this G7 and Russian symbiotic relationship, captured in a series of meta-rules defining a legislative framework for international partnerships, was maintained even in the face of war¹². The longevity of this type of international partnership showcases the interdependent nature of this industry for resources, including STEM-professional personnel.

These knowledge workers, with high job demands and high levels of autonomy (Karasek & Theorell, 1990), handle important on-the-job challenges that untrained, or less qualified individuals, would find difficult, if not impossible, to address. Specifically, the global work force of space professional are recognized in the literature as being resilient, able to weather the amount of cancelled programs that outnumber the amount of completed ones, and who are capable to work the long hours required (Allan, 2004; Lang et al., 1999). Research on these STEM-professionals, in this industry, also talked to their ability to master communication skills beyond the technical (Lang et al., 1999), and a capacity for going through a tremendous amount of paperwork/documentation on a daily basis (Allan, 2004). Significant challenges to working interdependently were also noted between these space industry STEM-professionals in the Japanese Space Agency (JAXA), who were attempting to work with either ESA, NASA, or CSA (Sandal &

¹¹ The Organisation for Economic Co-operation and Development (OECD) (2011) highlighted that all Group of Twenty (G20) countries had a certain level of space capability based on a consideration of satellite launch capabilities alone.

¹² The 2014 Russian occupation of Ukrainian Crimea led to a number of escalating sanctions from various G7 partners. These economic and diplomatic sanctions specifically excluded the International Space Station (ISS) and the ongoing support of that initiative.

Manzey, 2009). Similarly, STEM-professionals in ROSCOSMOS, working interdependently with ESA/NASA/CSA, were also found to experience significant challenges with respect to working interdependently (Sandal & Manzey, 2009). Lozano and Wond (2000), in particular, found in their study of active duty and retired astronauts, and of international space agency personnel, that there were fourteen cultural factors that affected the interdependence aspect of global space exploration initiatives. Specifically, verbal and non-verbal communication styles, such as humour, were highlighted as necessary but that in the case of a multicultural crew, culture may dictate what is funny for one, and not for another. Lozano and Wond (2000) also noted that (cis)gender affected issues surrounding interdependence of roles in space. They found that (cis)gender roles, norms, and stereotypes created, at times, tension and conflict. Lozano and Wond (2000) furthermore focused on decision-making processes, noting that consensus was not necessarily achievable in space, and may require the commander, who was invariably a White-military-trained man, to make a decision, and in the process imposing order and boundaries on what can and cannot be done. Similar cross-cultural impacts were found among national groups of astronauts and international space agency personnel by other research initiatives (e.g. Kanas et al., 2000; Kanas, 2006; Tomi, Kealey, Lange, Stanowska, & Doyle, 2012).

The primary driver in the global space industry, from a G7 perspective, was, is and continues to be, the U.S.-based NASA. Their initiatives include the now-retired U.S. space shuttle, the ISS, and scientific research and technology development centered on how to get humans safely into space, to remain in space and to return to Earth. NASA appears to act as a character benchmark for the rest of this global industry to aspire to in

spite of their documented shortcomings. In particular, NASA's space exploration initiatives are underscored by discourses focused on a variety of "sexy" (Allan, 2004, p. 25) missions that inspire, and grab both insider's and outsider's attention. NASA's recognized need for ongoing success includes a 'can't fail' attitude (Schwartz, 1987). NASA's reputation for reliability engenders faith in other space stakeholders which persists despite NASA's identified and significant loss of life experienced over the last three decades (Schwartz, 1989). In particular, the U.S. Augustine Committee report (1990) went so far as to state with respect to NASA's reliability that: "in spite of (NASA's) imperfections, by far the greatest body of space expertise in any single organization in the world resides in NASA...NASA and only NASA realistically possesses the essential critical mass of knowledge and expertise upon which the nation's civil space program can be sustained...", (Executive Summary).

This institutionalized faith in NASA has tendrils in the past, and is perhaps best personified in Tom Wolfe's (1979) Right Stuff myth of the Mercury 7 all-White men astronauts. The Mercury 7 astronauts were hailed as heroes where,

the idea here...seemed to be that a man should have the ability to go up in a hurtling piece of machinery and put his hide on the line and then have the moxie, the reflexes, the experience, the coolness, to pull it back in the last yawning moment - and then go up again the next day, and the next day, and every next day... Manliness, manhood, manly courage... there was something ancient, primordial, irresistible about the challenge of this stuff (Wolfe, 1979, p. 24).

This NASA institutionalized masculine ideal has further been captured within the academic literature where catch phrases such as “no sissy stuff” and being “kings of the mountain” (Maier, 1997, pp. 952, 954) were found to be prevalent. NASA has also been characterized as exhibiting “arrogant hubris” (Maier, 1997, p. 957), a “sober concern for facts”, and of “making infallible decisions”(Schwartz, 1987, pp. 59, 63) when it comes to such areas as ‘manned’ spaceflight (U.S. Augustine Committee, 1990). These NASA stories, centered on the masculine ideals, have since propagated throughout the global space industry creating and recreating cisgender formal and informal rules that are embraced even today.

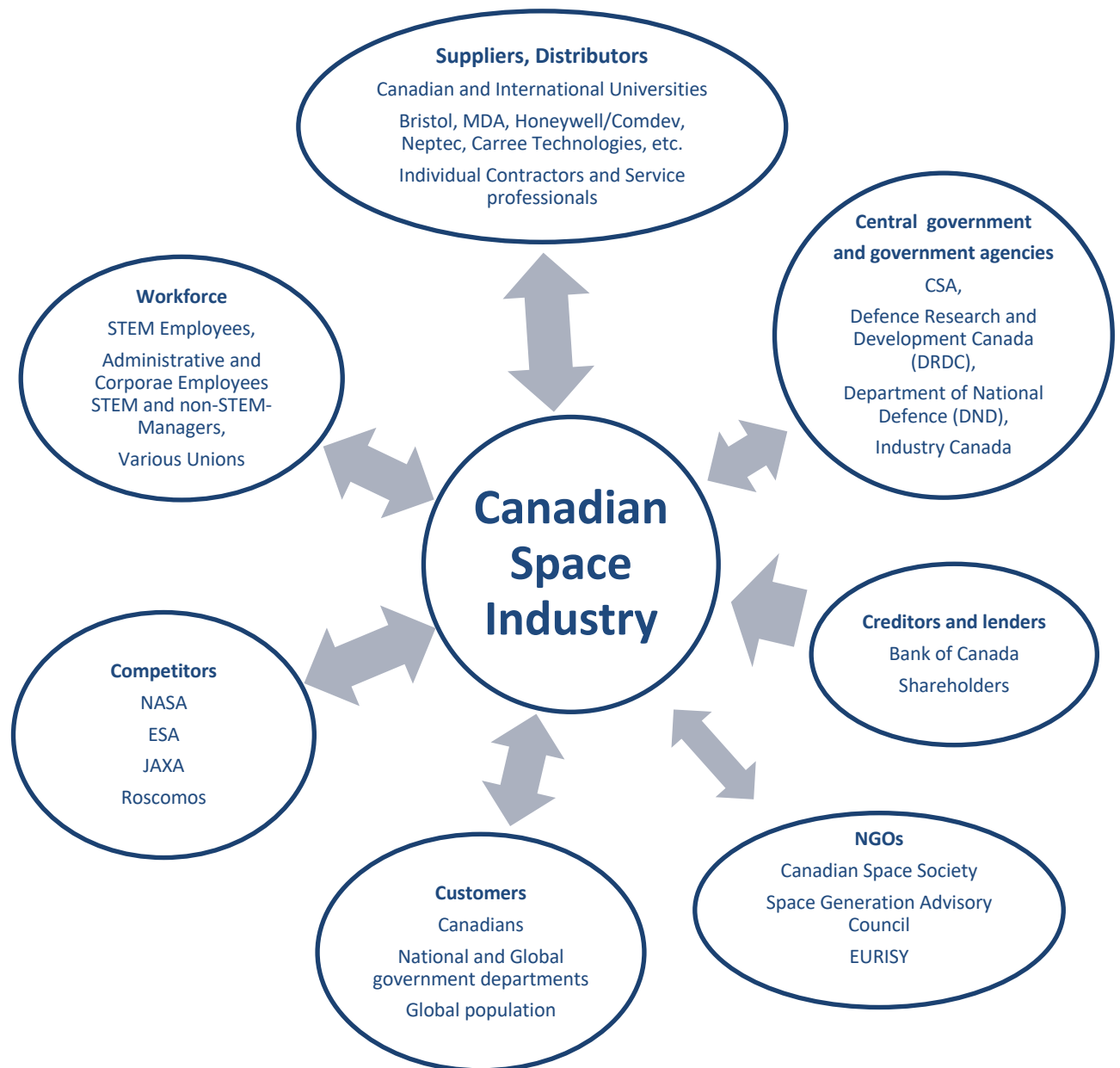
The complex global relationships involved in space and its exploration have important impacts on the Canadian space industry. I now turn to this global stakeholder.

The Meso: Canadian Space Industry

The Canadian space industry was brought to the attention of the world with the launch of the Alouette satellite over 50 years ago. The Canadian industrial space sector, however, only took formal shape following the Canadian federal government's meta-rule, entitled the *Canadian Space Agency Act*, that was proclaimed in 1990. With the creation of the CSA, this organization was, and continues to be, at the center of coordinating, financing, and promoting the Canadian space science and technology development sectors. The CSA’s mission, another meta-rule, is to lead in the development and application of space knowledge for the benefit of Canadians and humanity (CSA, 2015). It achieves this by “pursu[ing] excellence collectively, advocate[ing] a client-oriented attitude, support[ing] employee-oriented practices and open communications, commit[ting] itself to both empowerment and accountability, and pledg[ing] to cooperate

and work with partners to [their] mutual benefit” (CSA, 2015). The CSA has important regulatory responsibilities, protected within the *Canadian Space Agency Act*, over its suppliers and distributors also. The CSA provides access to key resources, such as the ISS, and other microgravity vehicles, via an extensive set of formal rules and partnership meta-rules. The organization also ensures that science experiments, commonly called payloads, are conducted within safety standards negotiated and set by the global space industry partners. The CSA is furthermore responsible to the formal parliamentary rules surrounding spending, and that the space initiatives that are funded, comply with meta-rules captured in legislation and other formal rules.

Many of the Canadian space initiatives are conducted by privately held organizations, such as MDA, universities and private research entities, such as University of British Columbia and York University. There were, in 2013, over 200 for-profit companies, universities, and government departments in the Canadian space industry (CSA, 2013). Figure 4 presents a partial stakeholder map of this industry.

Figure 4: Canadian Space Industry Stakeholder Map

The Canadian space industry plays an integral part in the continued growth of science and technology innovations in the Canadian economy (CSA, 2013). Specifically, as I

introduced in Chapter One, the Canadian space industry, in 2012¹³, generated yearly revenues of \$3.32B (CSA, 2013). The Canadian space industry, just as its global space partners, conducts business in a risky environment characterized by: extreme capital cost requirements¹⁴; unique raw material requirements; and, a need for highly-specialized human resources. With respect to this Canadian space industry workforce, employees and managers are for the most part highly-skilled STEM-professionals, as a formal rule. The demographics of this industrial workforce warrants its own section, given its very complexity, and the focus of this research.

The Micro: Demographics and Organization-Specific Formal Rules

Exploring space requires the participation of numerous industries that are focused on a variety of space initiatives. Canada, in particular, has many scientific research and robotics programs centered on how to get humans safely into space, to remain in space, and to return to Earth. The human aspect of these Canadian space exploration initiatives is an integral part of what I call ‘doing space’. In order to ‘do space’, there is a predefined rule that identifies the need for individuals to fulfill various occupational roles, from the professional and scientific/technical to the administrative. In the STEM-management occupational role, as I introduced in Chapter One, there was less than 20% of the management positions that were occupied by STEM-professional women (CSA, 2012b; Catalyst, 2013). Exploring the demographics of two of the key players in the Canadian space industry demonstrates the magnitude of this exclusionary social reality.

¹³ Complete statistical data across the Canadian and world space industry is available until the 2012/2013 fiscal year, running from April 1 to March 31.

¹⁴ The ISS has an estimated cost of \$35-160B (Minkel, 2010).

MacDonald Dettwiler and Associates Demographics: MDA was, and continues to be, the largest private space industry company in Canada. MDA had anticipated revenues topping \$1.9B for the year 2012 (Waddell, 2012). In that same year, MDA had no women in its senior officer positions out of a possible eight positions (Catalyst, 2013). By June 2015, one woman was on MDA's corporate board (MDA, 2015). Unfortunately, no other statistical breakdown exists for women beyond these public statements regarding its senior officer positions. This lack of publicly available information, from the largest private space company in Canada, indicates that MDA does not wish to reveal this type of information. Are they doing this to avoid uncomfortable questions about their demographic reality? Or, are they doing this because they haven't thought about this social reality?

Canadian Space Agency Demographics: This public organization, in contrast to MDA's lack of publicly available information, showcases the social reality of exclusion in great detail. The CSA had 652 highly-qualified professional employees¹⁵ in 2013 (CSA, 2014). There was a total of twenty-four executive (EX) management positions for this same time period (CSA, 2014). Within these twenty-four positions, there were five executive EX positions held by females¹⁶ and nineteen by males (CSA, 2014). Of the five females, one, a White, French Canadian, mother with a PhD in engineering held a scientific EX professional position, out of a possible total of fourteen engineering and scientific management positions (CSA, 2014). The remaining four White females were in

¹⁵ Such employees include those that were indeterminate and those that were on a term or a fixed contract (CSA, 2014).

¹⁶ Note that the CSA demographic statistics found in the reference referred to 'women' and 'men'. However, given the chosen nomenclature for this research I must use 'females' and 'males' as the organization was not addressing cisgender roles but sex-based ways of identifying individuals.

the Administration and Foreign Service occupational category out of a possible ten positions (CSA, 2014).

Table 1 summarizes this demographic reality of the CSA.

Table 1: Representation of EE groups vs Work Force Adjustment (WFA) in the Executive Group

(CSA, 2014)

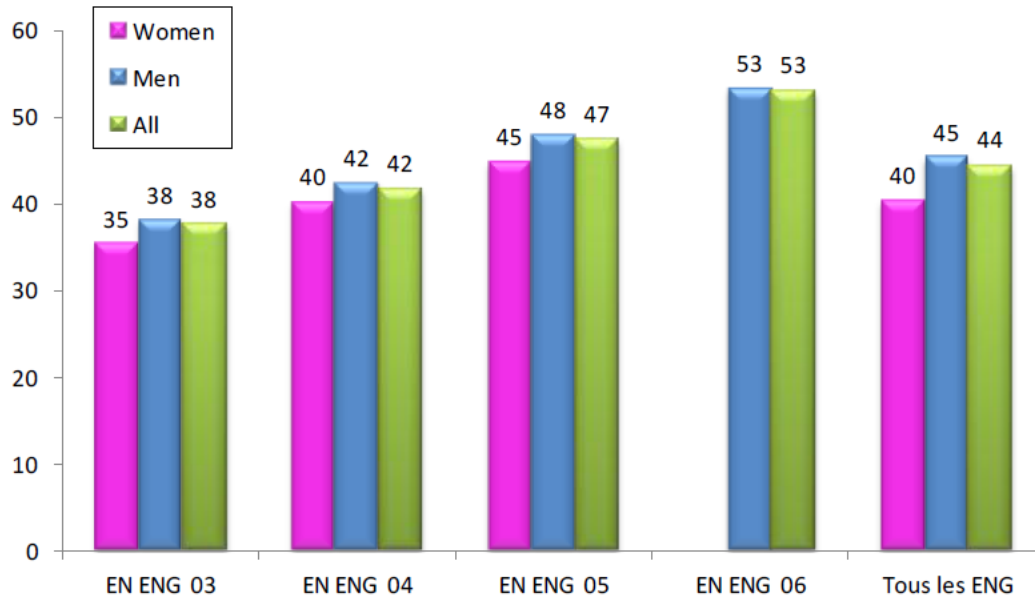
Professional Level	Total Positions available (as of March 31, 2013)	Females		Aboriginals		Persons with Disabilities		Visible Minorities	
		CSA	WFA	CSA	WFA	CSA	WFA	CSA	WFA
Senior Management (EX)	24	5	7 (31%)	0	1 (2.8%)	0	1 (4%)	4	2 (10.5%)

For comparison purposes, while females working at the CSA represented 7% of the scientific and engineering executive workforce (CSA, 2014), within the entire Canadian public service females made up 46% of EX positions for this same time period with a workforce availability of 44.7% (Clerk of the Privy Council, 2015). The CSA had no representation at the EX level in either Aboriginal/First Nations individuals or persons with disabilities. Again for comparison purposes, Aboriginals/First Nations individuals represented 3.7% of the EX positions, and persons with disabilities made up 4% of the EX workforce in the Canadian public service (Clerk of the Privy Council, 2015). With respect to visible minorities, the CSA exceeded WFA with a total of four males that were raced and/or of ethnic origin that occupied EX positions. Again, for comparison

purposes, the entire public service saw an 8.2% EX representation versus a WFA rate of 7.3%. It is important to underline that no other data is available regarding whether Canadian EX women self-identified as Aboriginal or First Nation, or as a person with disabilities, or as ethnic, or raced.

Key population groups that are important towards succession planning for senior management and leadership positions are referred to as executives minus 2 (EX-2) and executives minus 1 (EX-1) positions. These are typically called supervisors and managers, respectively (Clerk of the Privy Council, 2015). In 2013, there were 175 supervisors, functional managers and directors at the CSA. Females made up 31.4% of this management group. The majority of this group occupied corporate (administrative) positions such as in the Vice-President's office (P. Tanguay HR Advisor, personal communication, November 26, 2013). Within the entire public service, representation of females (38.8%) was slightly higher than the WFA (37.6%) in the EX-1 level and similarly for the EX-2 levels (46.4% versus 42.5%) (Treasury Board of Canada, 2014). What is most interesting with respect to these CSA feeder groups is the visible under representation of women in the engineering management profession. In Figure 5¹⁷, this visible under representation is notable when one looks at the Engineering 5 level (or EX-2) women's representation and Engineering 6 level (or EX-1) representation. We see clearly that no females held an Engineering 6 level position at the CSA (CSA, 2014). Unfortunately, there is no similar reported data for other CSA STEM-professions, such as Physical Sciences, Biologists, etc.

¹⁷ Since one third of the CSA workforce is engineers, the CSA produced this data to address issues of retirement and age in this STEM occupation.

Figure 5: Engineers Average Age by Classification and Gender

The data include indeterminate and term employees whose substantive position is at the CSA.

Summarizing, the demographics of MDA and of the CSA showcase some of social practices, and some of the rules and meta-rules with respect to the exclusion of STEM-professional women from STEM management positions. The vast majority of women, STEM-trained and otherwise, in this industry are relegated into administrative management roles. The few women who are fortunate enough to hold STEM-management positions are either token (Kanter, 1977), such as the one woman on MDA's board or the one PhD at the CSA, or are hidden from public view as I was. To clarify, I held a Life Sciences Mission Manager position, a PC-4 (EX-1) classification. I did not appear in any of the demographic tables in the yearly reports produced by the CSA, from 2003 until my departure at the end of 2016. In addition, the lack of visibility into STEM-

professional women who identify as either Aboriginal/First Nations, Visible Minority, or as a person with a handicap also speaks to their hidden existence within this industry. It could be argued that these STEM-professional women who self-identify as raced and/or of an ethnic/Indigenous background, per the meta-rule of *Employment Equity* legislation, are also hidden.

A Sample of Organizational Rules within the CSA: There are various organizational CSA rules, whether they be formal such as training, policy directives, human resources hiring policies and practices, or informal rules, such as those practiced in the day-to-day encounters in the work place, that create and recreate behavioral norms. These formal and informal rules have been in place for a number of years, and some continue to be touted as an effective answer to the problem of exclusion for historically-identified disadvantage groups. For example, the CSA identified a number of different policy¹⁸ and training initiatives including mentoring, bias and harassment training, and equity guidelines for conducting bias-free interviews (CSA, 2003, 2012b). These various initiatives are in line with Canadian legislation such as the *Employment Equity Act* (Supreme Court of Canada, 1995).

In spite of these formal rules and the overarching meta-rule of the *Employment Equity Act*, exclusion of STEM-professional women continues to be reflected in not only the demographic reality of this industry but also in the day-to-day social interactions within the organization. For example, some women within the CSA, including myself, tended to accept unwanted jobs, identifying them as ‘a necessity’ to move our careers forward.

¹⁸ A 2016 policy initiative, led by the Status of Women Canada, entitled ‘Gender-Based Analysis+’ has just recently been embraced by the CSA.

They believed, as did I, that this would ensure that they would keep learning and moving forward in their respective STEM professions. Men, on the other hand, tended to flat out refuse to take on these ‘boring’ jobs in this industry. This particular anecdotal experience was supported by the findings of this research study, as I will present in the analysis Chapters Six and Seven.

Another informal cisgender rule, that I also experienced personally, centred on working with people who, simply stated, frighten them. Some STEM-professional women work with men who yell at them, who throw things at them, and/or who refer to them as objects, sexual or otherwise. These women find these frightening encounters daunting and contradictory to navigate on a day-to-day basis. Specifically, they may find the courage to ask questions, in order to disarm the situation, only to find that they are told one thing and then told another, or in severe circumstances, they may be yelled at for asking the question in the first place. Some women may get to the point of no longer trying to navigate these frightening situations, preferring to not react to them, internalizing their fear, and ‘hiding’ in the face of these behavioral norms. A tangible example of this particular informal cisgender rule involves my past working relationship with my direct supervisor. He would note down on a pad of paper, on a regular basis, where I was and what I was doing. He also insisted on having full access to my electronic work calendar. To my knowledge, I was the only one, and the only woman, in our team of five Mission Managers to have to navigate this cisgender presentism informal rule. I did eventually call my union to ask their advice on how to proceed with this situation. The advice I received from the union lawyer was to communicate more with my supervisor, to let him know where I was and what I was doing, and to reassure him that I

was indeed committed to the departmental goals. When I happened to mention this advice to a male colleague, who happened to be a union representative (for another union), he said quite sternly: “You should have been told to say this to your supervisor: ‘Stop harassing me. If you don’t, I will report this as sexual harassment’”. This example resonated for me on so many different levels: I was ‘supposed’ to be courageous enough to call out my direct supervisor for his cisgender approach to managing me, by either talking to him, giving him even more information about my activities, or I was supposed to call him out as sexually harassing me. As will become clearer in Chapter Eight, one early and two late-career participants in this study faced similar informal rules, and were for the most part no longer able to be ‘courageous’ in light of their frightening work-related experiences.

Moving beyond these two informal rules, Mills and Murgatroyd (1991) make reference to education and organizational cisgender rules that can permeate the social. They also pointed out that these cisgender rules are “not experienced as a monolithic system” (Mills & Murgatroyd, 1991, p. 91), and that they are not “unilinear, or completely one-sided” (Mills & Murgatroyd, 1991, p. 90). These characterizations of these informal cisgender rules led me to consider the engineering and science academic literature. In delving into these bodies of knowledge, I wanted to gain a better understanding of these informal cisgender rules, in the Canadian space industry, and how the influence of STEM-fields, in particular, can play a role.

Engineering and science in the academic literature

The literature focused on the engineering and science professions has historical roots in male-dominated military institutions (Hacker, 1989; Royal Military College, n.d.).

West Point, the first U.S. military and engineering school established in 1802, was based on the French military system of the *École Militaire/École Polytechnique* where rigid military discipline, creating the ‘best’ engineers, mathematicians and officers were professed organizational goals (Hacker, 1989). The Military College of Canada, founded in 1874, was based on this U.S. military example and the similar British system. The Canadian equivalent of the military college system focused on military tactics, fortification, engineering and general scientific knowledge of education (Hacker, 1989; Royal Military College, n.d.). This military system, at arm’s length from the Canadian government’s National Defense, specifically excluded women until 1979. The military, and the accompanying engineering fields, were constructed as purely hierarchical structures, demanding obedience and loyalty to the few at the top. Hacker (1989), in particular, argued that the military provided the first instance of structured (cis)gender hierarchy, and that military engineering served to maintain (cis)gender stratification during periods of rapid change, such as in war and military conflict efforts.

Early studies on women in engineering stated that the mathematically intensive demands of engineering acted as a filter to women, ignoring the male-dominated cultural heritage of this profession (Hacker, 1981). Subsequent research over the years debunked this myth, showing instead that some women excelled and, in some cases, surpassed men in the technological/technicist side of engineering (Faulkner, 2007; Robinson & McIlwee, 1991; Sharp, Franzway, Mills, & Gill, 2012). This idea of women surpassing men in this field of study was in spite of the ideological view of engineering as following ‘passionately’ a “craft ethic” (Robinson & McIlwee, 1991, p. 405), and as seeking a mechanistic control over nature (Jorgenson, 2002). These ideas of craft ethic and

mechanistic control are imbued with masculine-ideal behaviors as seen in such studies on aircraft engineering at British Airways and other international airlines (Mills, 1998). Furthermore, some researchers (e.g. Faulkner, 2000; Morgan, 2000) found that women believed that engineering was (cis)gender-neutral where merit and skills were held above all else. Extensive research (e.g. Faulkner, 2007) has discounted this (cis)gender-neutrality notion within engineering, specifically where promotion of women is concerned.

Professional engineering and science, as we know these professions today, continue to be male-dominated (Evetts, 1998; Hacker, 1989; Hanappi-Egger, 2013; Jorgenson, 2002; Vetter, 1981; Wulfe & Gail de Planque, 1999). Positivist and postpositivist streams of research focused on cisgender and identity in engineering/science are extensive (e.g. Chu, 2006; Faulkner, 2007; Hanappi-Egger, 2013; Jorgenson, 2002). Etzkowitz, Kemelgor and Uzzi (2000), in their investigation of women within these male-dominated fields, found women who did not experience a sense of belonging experienced low self-confidence, questioning repeatedly why they were there, and what they were doing. Miller (2004) suggested, in her study of women engineers in the Canadian oil industry, that occupational/masculine/organizational values specific to engineering reinforced cisgender divisions. She found that women, in her study, “conformed to the dominant culture in order to survive and, over time, incorporated the values of the industry...walk(ing) a very fine line between being ‘like’ the valued-masculine prototype and avoiding any implication that they were not ‘real women’” (Miller, 2004, p. 68). Similarly, Powell, Bagilhole and Dainty (2009) found that within engineering professions, women would perform their cisgender – or ‘undo’ their cisgender – acting

like ‘one of the boys’, accepting the (cis)gender jokes, looking at the advantages over the disadvantages thereby adopting an ‘anti-woman’ approach. Shantz, Wright and Latham (2011) found that women engineers were less likely than men to attain a senior engineering position because, in part, these women did not use networking as a job search tool – a masculine-ideal notion. In addition, Hewlett et al. (2008) found that 52% of women STEM professionals left the profession in their mid to late-thirties, thereby contributing to a lack of women in STEM senior professions. Jorgenson (2002), looking at discursive performances of women engineers in male-dominated professions, found that these women adopted a variety of discursive positions to support their ‘qualified professional’ identities. These women would talk to their credentials and awards as a way to introduce their acceptable status within the male-dominated profession. In addition, Jorgenson found across all her participants that they were unwilling to acknowledge the cisgender nature of the engineering profession.

From this body of literature focused on engineering and science, it becomes clear that cisgender is one of the identity categories that I had to address in this thesis. However, the question of whether cisgender is a self-identity or a social-identity can be a contentious question to address. What I did notice in these engineering and science studies is that if identities, including cisgender, were addressed, the authors were focused on self-identity exclusively. Social-identity does appear, such as in Chu (2006) and in Castro et al. (2013), but is for the most part ignored. Many of these engineering and science studies, that were focused on male-dominated STEM industries, also ignored the “web of rules (of masculinity)” (Mills & Murgatroyd, 1991, p. 74) that ciswomen and cismen must learn to navigate. Similarly, studies focused on intersectionality, across any

of these professional engineering and science streams, were not present. Within the engineering literature itself, Beddoes and Burrego (2011) found that there was minimal research being done that embraced intersectionality or interactional/masculinist studies, as they called it, in their review of journals from 1995 to 2008. Some studies did focus on the identity dualism of engineering and cisgender; however, these identities were separated out into component identities, where heterogeneous identities that are interconnected and dependent on each other were ignored (Faulkner, 2007). In addition, issues of race and ethnicity, along with cisgender for women in STEM positions, were under-represented in the engineering and science literature (Johnson, 2011; Torres, 2012).

So What?

I had two motivations to present this material in this way: (1) to provide the reader with an understanding of the context - meta-rules, rules, and social values - and the role of context in the exclusion of STEM-professional women in the space industry; and, (2) to develop my credibility as a researcher within this context. I believe I have achieved these two goals. The eternal question of ‘so what?’ comes to mind now, in light of this examination of the space industrial context, and the engineering and science literature.

There are a number of factors that are at play in Canada’s efforts in ‘doing space’, and the exclusion of STEM-professional women. Cisgender, the assigned feminine and masculine-ideals, are at play in either formal or informal rules. While Mills and Murgatroyd (1991) introduced these cisgender rules as being a ‘monolithic system’, I can’t help but see the informal cisgender rules working as its own system through, for example, the education STEM-system well into the STEM organization. Case in point,

the military roots to engineering and science were presented along with various cisgender-based empirical findings focused on women's experiences in STEM fields. The primary driver in the global space industry was, is, and continues to be, the U.S.-based NASA, where evidence was presented that NASA appears to act as a masculine-ideal character benchmark for the Canadian space industry. Decision-making processes in 'doing space' invariably requires that the White-man takes the lead. Similarly, and most importantly, communication and discursive practices were identified as key challenges within multinational space, and Earth-based, crews.

The other aspect from this literature review that stands out is the academic's eternal search for a literature gap to fill. I did find such a gap in our knowledge focused on STEM-professional fields. Notably, intersectionality scholarship with respect to engineering and science professions is missing. Also, social-identity and cisgender in studies focused on STEM fields is rarely addressed. With these important understandings of the knowledge acquired so far, I can now move to the first branch of the research framework for this study, forms of context.

Research Framework: Forms of Context

Forms of context, as I introduced in Chapter One, consists of meta-rules, rules, and formative contexts. I consider each in turn.

Meta-Rules: The notion of meta-rules can be used across different disciplines, including artificial intelligence (AI) and project management. In AI¹⁹, meta-rules were defined via the following characteristics:

¹⁹ I've chosen the academic area of AI to showcase meta-rules because AI, in essence, is trying to reproduce social constructions at the level of coding, and what computers can 'know'. AI academics are

- (1) Meta-rules are rules making conclusions about other rules;
- (2) Meta-rules are “knowledge about knowledge” (Davis, 1980, p. 192);
- (3) Meta-rules use inexact reasoning, based on initial rules. In other words, meta-rules could in theory use binary logic standards, but they don’t have to. Delays in applying a rule, within a meta-rule, are an integral part of the process;
- (4) Finally, they have a utility and are not necessarily valid. Thus, they may fail (Davis, 1980; Davis & Buchanan, 1984).

Within project management, meta-rules were defined by Jolivet and Navarre (1996) as a “set of common organizational directives” (p. 266). They too noted that meta-rules are “rules that produce other rules” (p. 266), calling on legal infrastructures that provide consistency, efficiency, and “decentralized production of the local rules” (p. 266). Meta-rules can also be characterized as system wide rules (Helms Mills et al., 2010; Mills & Murgatroyd, 1991), where a system can be such notions as globalization, public organizations, private organizations, economics such as capitalism, employment equity legislation within Canada or affirmative action in the US, human rights, etc. Demographics, a statistical system, can also be characterized as a meta-rule.

Another important characteristic of meta-rules is their relationship with organizational discourses. While discourses can be framed by social interactions among individuals, discourses can also be framed by an organization or an institution. Think of how specific acronyms or jargons can easily be used within one work environment but cannot be ported into another environment, as chances are no one would understand what is being said. For example, within the CSA, acronyms are used extensively, sometimes to

breaking down social interactions in such a way that a robot or a computer can, in certain circumstances, imitate and reproduce human, social interaction.

the point of forgetting what these acronyms stand for. We create documents of all of our acronyms, organized by specific projects/programs such as life sciences/astronauts (e.g. ALSSM – Astronauts, Life Sciences, Space Medicine) or operations (e.g. POIWG – Payload Operations Integration Working Group) or robotics (e.g. EEPROM – Electrically Erasable Programmable Read Only Memory). These acronym documents act as meta-rules for the space program, and reflect the larger meanings captured within the notion of discourses.

An institution can have its own set of meta-rules, or they can have outside meta-rules that influence their social reality. For example, Katila and Merilainen (2002) found that meta-rules, such as women as sex objects, and discourses surrounding this meta-rule can explain common action, such as discrimination, within an organization. Beyond these influences on common actions, meta-rules can be broad in scope and in application, and can “represent points of intersection between numbers of formative contexts” (Helms Mills et al., 2010, p. 190) such as the space industry organizations, and the space industry labor unions, who work to protect their respective concerns. Meta-rules represent complex processes of innovation and reconciliation, along an infinite number of possible arrangements of social practices among individuals. This particular characteristic does not imply, however, that there is a unity of belief and of social values (Helms Mills & Mills, 2000).

Rules: Rules are social constructions that impose order in organizations. In other words, they assist in our efforts to structure organizations (Mills & Murgatroyd, 1991). As I presented previously, rules can be broken into different categories that include formal and informal rules, written and unwritten rules, policy driven and ethically driven

rules. Rules whether informal or formal, written or unwritten, can be influenced by discourses of the everyday interactions among individuals. Rules may empower or limit how individuals act within a work environment. They also evolve from their creation and establishment within an organization to how they are reproduced, enforced, misunderstood and resisted by individuals (Helms Mills & Mills, 2000). This rules evolution can be studied via discourses, revealing power-relations within and among individuals who are working together in an organization (Thurlow, 2007).

Formal rules can be characterized as guidelines that are put in place as a function of perceived organizational purposes. Formal rules reflect the routinized necessities of an organization. They can include such things as hiring protocols, distribution of grant and bursary moneys, the need for equitable hiring practices, etc. (Helms Mills & Mills, 2000). These formal rules can be influenced by legal, technology, management practices, dominant social values and practices, and job specialization (Helms Mills & Mills, 2000). Formal rules are most often written, but they can also appear as unwritten rules such as when subordinate employees are expected, as a norm, to work later than their managers; or, the standard business dress code of suit and ties for men. Formal rules can be reproduced in everyday narratives, such as in hiring interviews where such things as hours of work, number of breaks allowed per day, and benefit and training options are discussed among the interview panel and the interviewee.

Informal rules reflect norms of behavior, within an organization or a social setting, that are not necessarily required to meet the purposes of an organization (Helms Mills & Mills, 2000). Social settings refer to interactions among individuals say around the water cooler or in organizational activities, such as golf tournaments or in meetings. These

social settings allow for the creation and recreation of norms of behavior that can complement, cooperate, and/or interfere with formal organizational rules (Pejovich, 1999). For example, as I presented previously, I was challenged to an arm wrestle in a meeting to resolve a contentious issue. This was not an organizational formal rule that the man was enacting, but an informal masculine-ideal behavioural norm. So, while the outcome of the arm wrestling ultimately cooperated with an organizational formal rule (that is, we reached a decision to meet an organizational objective), the spontaneous use of this informal rule established a norm of behavior (that is, man is physically stronger than woman therefore man's decision will prevail) that colored our interaction in this social setting. In other words, the informal rule became congruent with a formal organizational rule, where they mutually reinforced each other (Chavance, 2008). The informal rule, however, did nothing to establish an equitable relationship between the two of us. This example also highlights that informal rules can be shared in the everyday, and can be written and/or unwritten, just as formal rules can be. In some cases, informal rules can become formalized into an organization's set of guidelines. Informal rules can be characterized in a negative light, such as in corruption, tax evasion, informal economies, discrimination; they can also be sites for important social change, such as establishing and practicing social norms and values that celebrate difference, where trust, business ethics, and informal cooperation underscore these arrangements (Chavance, 2008). Informal rules can be based on long-standing cultural behavioural norms, such as the masculine-ideal versus the feminine-ideal, that become resilient. They can also be based on a weak relationship with norms and values (Chavance, 2008).

The evolution of rules, formal and informal, via discourses and social interactions, is not a linear experience. Helms Mills and Mills (2000) did remark that “rules are primarily the creation of actors, but, once established, they appear as structures standing over and above people” (p. 60). This characterization of rules could imply that informal rules lead to formal rules, but this is not always necessarily so. In some cases, formal rules emanate from social interactions among senior management/CEOs, and are enacted by these same individuals, and others, are enacted within an organization. In other cases, formal rules emanate from meta-rules, where we build knowledge upon knowledge. And again, in other cases, informal and formal rules can be created from social values, and practices, reflective of social interactions and discourses of non-management personnel.

Formal and informal rules can be accepted, negotiated, challenged, misunderstood, or resisted by individuals within an organization (Mills & Murgatroyd, 1991). Each of these enactments is important, has value, for this study. Resistance and its various forms, in particular, remains a focus of many academics and social activists, across such streams as philosophy and sociology. Foucault, notably, talked extensively about resistance norms (Foucault, 1984b, 1984c, 1988b). I will address his treatment of resistance in his technology of the self in the next chapter. The possibility for micro-political forms of resistance (Davies & Thomas, 2004; Hutton, 1988) will be consider now.

The characterization of resistance, for an individual, is one that moves us away from economic and environmental concerns of the organization towards the nuances of individual’s and their enactments of resistance (Thomas & Davies, 2005). Micro-political resistance, inspired by Foucauldian philosophies, was defined by Weedon (1999) as: “winning individuals over to these discourses and gradually increasing their social

power” (p. 111). This production of micro-political resistance is not a ‘cause and effect’ type of resistance, as in you are denied an employee position because you are woman and you automatically call this out as discrimination, and launch a legal action. Micro-political resistance is reflexively constructed, and allows for subversive places to exist in such a way to challenge hegemonic discourses (Thomas & Davies, 2005). In this nuanced treatment, you may begin by acknowledging that you have been denied this position because you are woman, internalizing and blending this experience into your identity constructions retrospectively. You may also extract cues from rules and meta-rules to make sense of this social event, and the social environment, in question. You could go in any number of resistance directions, plausibly pulling from extracted cues and enacting the environment in question in an ongoing fashion (Weick, 1995). Micro-political resistance, framed within, for example, Weick’s treatment of sensemaking, is then not a knee-jerk ‘action-reaction’ relationship but a much more nuanced experience. Such a treatment of resistance, within this understanding and practice of informal and formal rules, opens the door to a spectrum of possibilities with respect to social constructions and reconstructions of everyday interactions.

Formative Contexts: Formative contexts bring together dominant social values with individual action (Helms Mills et al., 2010). More specifically, Unger (1987b) stated that formative contexts “consist in imaginative assumptions about the possible and desirable forms of human association as well as in institutional arrangements or non-institutionalized social practices” (p. 89). Formative contexts, which reflect shared beliefs, not only provide continuity and coherence, they also limit, and set boundaries on, how individuals imagine what can be, and what can be done, within a social reality

(Blackler, 1992; Crawford & Mills, 2011). As Crawford and Mills (2011) summarize, Unger's formative contexts are constructed along five themes: distinction between formative contexts and routines; relativity between preserving routine, and transforming conflict; variability of entrenchment; movement towards entrenchment; and, replaceability of elements in that formative context.

Importantly, formative contexts on their own have "little to say about agency" (Mills & Helms Mills, 2004, Kindle Location 3239). They can provide a window into some of the power-relations that are at work among individuals and within the individual. Formative contexts can compel us to move away from being passive 'victims' of the formative context that individuals created (Unger, 1987b). However, formative contexts do not tell us that an individual will necessarily move in that direction away from say, passivity, to change either an element of the formative context or the entire context in question. These formative contexts push us to consider the social interactions themselves, reproduced in discourses, creating a site of study focused on institutional arrangements. The window into these arrangements then compels a researcher to take a closer look at the discourses that individuals share, in order to tease out these 'imaginative assumptions' regarding human association.

Forms of Context: Bringing these three concepts together reflects the first branch of the theoretical framework for this study. Individuals within an organization are part of, and are exposed to, meta-rules, rules, and dominant social values on a daily basis. These forms of context can provide a feeling of cohesion for these individuals (Helms Mills et al., 2010). They can also impose a sense of repression, "an injunction to silence" (Foucault, 1984c, p. 293), whereby an individual applies a host of disciplinary processes

to remain silent. This individual's subjection, in the face of forms of context, is linked to particular, historical processes which constrain an individual from thinking otherwise (McHoul & Grace, 2007).

Discourses, as I highlighted in all three concepts, become a window into forms of context. An individual's subjection and resistance can be studied in these discourses just as it can be studied in these individuals' practice of silence. I am interested in the study of individual's discursively shared informal rules, and social values, within a particular organization. As I presented above, these informal rules and social values can provide a gateway into the behavioural norms that color the day-to-day interactions among individuals. The arm-wrestling informal rule, for example, provided a view into social and behavioural norms including the need to recreate a masculine-ideal in the work place. While this informal rule, and its enactment, supported a formal organizational rule of achieving project effectiveness, the social interaction with this colleague was co-created along cisgender practices. 'Man' was physically superior to 'Woman' thereby putting me, the 'Woman', in my place. What role does this cisgender informal rule fulfill, in the short term and in the long term, with respect to social interactions? To be able to answer this question, I must turn to forms of knowledge and forms of experience, as forms of context cannot on its own address the subjective, and the experiences of such informal rules.

Chapter Conclusion

I began this chapter with a consideration of the practitioner, and the academic, literature focused on the global and the Canadian space industry. I provided a foundational understanding of meta-rules, rules, and formative contexts within the global and Canadian space industry in such a way to be able to build an understanding of the

experience of STEM-professional women in this industry. I also identified an important body of literature in the field of engineering and science, where a particular gap in our knowledge regarding intersectionality scholarship, and the role of social identity is missing.

The chapter closed with a presentation of the first branch of the research framework, forms of context. This first branch of the research framework pushes me to be concerned with the influence of meta-rules, rules, and social values as reproduced in the discourses of individuals within the Canadian space industry. Notably, meta-rules, rules, and formative contexts impose an order of ‘how things get done’ that influences individuals within an organization. Informal rules and formative contexts, in particular, meld dominant social values, and behavior norms, of an individual creating an important site for not only embracing and resisting the imposed order but also for being able to study the spectrum of possible experiences of these social values and informal rules. The study of these informal rules and social values will help me meld in organizational influences into the experiences of discourses, socio-psychological processes, and exclusion.

Chapter 3: Forms of Knowledge

The first section of this chapter is focused on an extensive literature review, on feminisms, poststructuralism, and intersectionality. This is needed, as I highlighted in Figure 1, in order to be able to create the theoretical framework's second branch, forms of knowledge. I begin with the 'problem', as I see it, with certain feminist stances. I then consider the poststructural perspective, which framed my ontological and epistemological beliefs. I include in this presentation of poststructuralism, a study of Foucault's three technologies as they relate to my ontological and epistemological stance. The literature on intersectionality is then considered, followed by an introduction to the relatively new area of intersectional feminism. The guiding principle for this literature review is one premised on identifying what has been learned so far, what is missing in the literature, and where my particular research contributes to expanding our understanding of this scholarship.

The second section of this chapter presents the next branch of the research framework, forms of knowledge. This section builds on the literature review, seeking ways to contribute clarity to this theoretical branch. This section rebuilds the Glenn (2004) anchor point concept, with a shift away from standpoint ideologies and moves towards Foucault's power-relations, and how to problematize them, in order to reveal the social reality, and the social individual.

Feminisms

There is no doubt that women have made great strides in the business world since the start of the 20th century. However, in certain industries, women's career progression has hit the proverbial glass ceiling, so named by Carol Hymowitz and Timothy D.

Schellhardt (1986). As I presented in the previous chapter, there is demographic evidence that there is a glass ceiling with respect to women holding STEM-management positions in the Canadian space industry. This exclusionary structural social reality exists in spite of a history²⁰ of Canadian legislative action (e.g. Abella, 1984), and policy initiatives within the industry (e.g. CSA, 2003, 2012b; Treasury Board Secretariat, 2012). When I started to ask the difficult questions with regard to this exclusionary social reality, I began to delve into the academic literature with the hope that it could shed light on women's experiences in the workplace. I was also curious as to this notion of the glass ceiling: could it not be reproduced discursively, in line with Buzzanell's (1995) approach via language, and how it recreates cisgender divisions in organizations?

Feminist academic literature has much to say on the issue of women in the workforce as I discovered. In the beginning of the 20th century, Parker Follett's (1925) innovative work, on power and motivating desires of scientific management, laid the groundwork for feminist knowledge to expand to such notable works as Kanter's (1977) important feminist, empiricist, objective-based research. Kanter's functionalist feminist approach advocated for a process of systematic observation in search of an objective and unitary 'truth' (Hawkesworth, 1989). From these antecedent searches for a unitary global 'truth', I started to recognize feminist-based research that was grounded in standpoint theories (e.g. Bernard, 1987; Harding, 1991; Hartsock, 1974; Hekman, 1999; Hill Collins, 2009; Smith, 1987). In much of these feminist standpoint-based studies, a woman's difference was valorized as a mode of resistance (Hekman, 1999). This research also explored how

²⁰ The focus of this paper is not to debate what history is or what it should be. For purposes of clarity, I define history to be socially constructed, in line with Foucault's discursive characterization of the 'past' (Foucault, 1969; Weatherbee, Durepos, Mills, & Helms Mills, 2012).

class, race, cisgender, and materiality structured an individual's understanding, and their experiences of social reality. These standpoint theories resulted in materially-constructed 'truth' within this feminist stream (Hawkesworth, 1989; Hekman, 1999; Johnson, 2008).

I appear to be presenting my discoveries of these feminist-based approaches in a rather linear fashion which was not the case. I travelled back and forth between these searches for unitary 'truth', and materially-constructed 'truth', trying to find my voice and my beliefs in feminism. What struck me as I got lost in empiricist/modernist and standpoint theoretical perspectives was an attempt to class women within one uniform reality, privileging one "'putative' woman's perspective" (Hawkesworth, 1989, p. 538) over another. These various perspectives, in addition, did not always have a mandate to study change that can be called emancipatory (Fairclough, 2001). Furthermore, with respect to women in organizations, I found that the treatment of Western management heterogeneity was often referred to as trying to achieve the same or better productivity, effectiveness, and profit levels with a group of heterogeneous workers as it once did with the 'old' homogeneous ones (Thomas Jr., 1990). Thus, economic systems argumentation for heterogeneity in its workforce was instructing the worker to accept the dominant class controls in order to protect the organization's 'success' where this 'success' was measured via materialism (i.e. profit) indices. This material control of actors was, in effect, asking for a compromise equilibrium state that did not change the "essential" (Gramsci, 1982, p. 211) state of the dominant group, who was invariably the White man. These ideologies then relegated social organizational reality to only economic determinism while ignoring subjectivity/agency, and interactions between individuals. Gramsci (1982), in particular, referred to this economic domination of one social class

over another as hegemony. Gramscian hegemony was not only about domination, as I discovered; it was also about the projection of the dominant class' way of seeing the world such that those who were in subordinate positions came to accept this worldview as 'normal' and 'ordinary' (Smart, 1986). Ultimately, the dominated, via a "combination of force²¹ and consent, which balance each other reciprocally" (Gramsci, 1982, p. 210), acted in the interest of the elite. Was this the social reality that I wanted for myself and for other STEM-professional women? If so, I would then be placing myself within the dominated as a subordinate class, where I would be enacting a coordinated effort with, and for, the elite (Gramsci, 1982; Hearn, 2004; Smart, 1986). This did not strike me as emancipatory in the least.

When I considered the concept of cisgender specifically within this Gramscian economic hegemony, I found that the link to economic structures and processes of performance, and effectiveness, were further complicated. When I say complicated, I am specifically referring to Meyerson and Kolb (2000), Ely and Meyerson (2000) and Coleman and Rippin (2000) study. They all found that the duality of their cisgender-based and organizational effectiveness studies led to the failure of their action research cisgender project. Cisgender, in many of the standpoint feminist studies, was constructed as a process of social inequality categorization, between males and females. The social inequality based on these inequality categorization processes was referred to as patriarchy (Chafetz, 2004; Connell, 1983; Hearn, 2004). This theory of patriarchy accounted for such structures as cisgender labour stratification where elite men enact dominant social definitions of the masculine contributing to cisgender differentiation (Chafetz, 1988).

²¹ Force here could be interpreted as the dialectical force of oppression "which requires individual participation on a large scale in order to maintain its malignant life" (Butler, 1985, p. 508).

This theory did not, however, account for the role that cisgender women play in contributing to their subordination to this cisgender domination by men. (Cis)gender stratification theory (Chafetz, 1988) attempted to address women's role as a subordinate class. This stratification theory specifically assumed that women's economic situation in lower administrative and menial paying jobs contributed to these hegemonic dominating/subordinating practices. This theory, and many others arising from standpoint perspectives, did not consider what happens when women are well trained, well educated, and in economically viable²² positions. (Cis)gender stratification, I told myself, should end given women hold these positions and roles of economic strength since one of the primary assumptions of this theory was no longer valid. However, as I found in the Canadian space industry, structural (cis)gender stratification continues in spite of the economically privileged-class of STEM-professional women. I realized that the standpoint feminist perspective did not interact well with what I was seeing and living. As a result, I started to re-examine foundational ideas about my state of being. This led me to poststructuralism and Foucault (i.e. Foucault, 1969) and Butler (i.e. Butler, 1990).

Poststructuralism: Paradigmatic Positioning

The poststructuralist perspective is founded on the notion of 'difference'. Difference is a difficult term to control given the misappropriation in meaning that can occur. The reader is cautioned to not confuse poststructural 'difference' with implying that the opposite of 'difference' is 'sameness'. Difference, especially as I frame it within Foucault's technologies and philosophies, is used in the sense that we reproduce

²² Economically viable positions are considered to be positions that have extensive benefits (i.e. health and dental insurance, pensions, life insurance, etc.) and result in middle to upper class income levels for an individual.

uncertainties and a range of beliefs/meanings that we don't necessarily aim to resolve (Belsey, 2002). This notion of difference is reproduced by us, and this is done within the systems that we learn, assign meaning to, and enact. As such, a poststructuralist examination of any social reality compels the researcher to no longer think about binary oppositions such as men versus women, Black versus White, rich versus poor, educated versus un-educated as these collectivities invoke sameness and difference arguments that are not appropriate within this perspective.

Given this framing of difference, poststructuralism's central tenet is the examination of a variety of social realities via discourses, values and norms (Weedon, 1991, 1997). Poststructuralists have no doubts that there is a 'world'. They have questions about what they can know of this world, and how they can know this world. That is, they question the claims of certainty, or of 'fact', stable 'truth', about this world (Belsey, 2002; Weedon, 1997). While these statements appear to signal that poststructuralism is a unified perspective, it is anything but that. There are many branches of poststructuralism extending from de Saussure (e.g. Saussure, 1959) to Althusser (e.g. Althusser, 2010) to Foucault (e.g. Foucault, 1977) to Derrida (e.g. Derrida, 2017) to Lacan (e.g. Lacan, 2016) to Žižek (e.g. Žižek, 2014). Poststructuralism is not a unified body of knowledge to any stretch of the imagination. Foucault's philosophies, in particular, compels us to consider the reconstruction of the various social worlds based on webs of power-relations among individuals, and that this reproduction among these webs leads to fragmented 'truths' that can be examined to reveal the social. At this point in my readings of Foucault's scholarship, specifically his later work after *Discipline and Punish* (Foucault, 1977), I couldn't ignore how my experience of power-relations and the discourses in the Canadian

space industry played an integral part in ‘who I am’ and ‘who I am becoming’. I took the time in Chapter One to share and reflect some of these discourses in my act of reflexivity, the first “I” of intersectionality. My fractured state of being, within the Canadian space industry, was then in close alignment with Foucault’s reconstruction of the self within a social world.

I embraced Foucault’s (1977, 1978, 1982, 1984b, 1984c) teachings, specifically his “... bodies of knowledge (discourses) as potentially discontinuous across history rather than necessarily progressive and cumulative” (McHoul & Grace, 2007, p. 4). To this end, I relied on Foucault’s *régime des pratiques* (system of practices) as norms (Perrot, 1980). The Foucauldian system of practices is grounded, in part, on the technology of the self and subjection, of power-relations, and of discourses/knowledge which I will consider in turn below. As for these norms, they are fundamental to the exposure of subjection of the subject. Norms in this research are reflected via organizational meta-rules, rules, and dominant social values and were considered in Chapter Two within the context of the space industry. Foucault’s system of practices is considered now in more detail, beginning with his technology of the self and subjection, and then moving onto power-relations, and closing with discourses.

Technology of the self and subjection

...I do indeed believe that there is no sovereign, founding subject, a universal form of subject to be found everywhere. I am very skeptical of this view of the subject and very hostile to it. I believe, on the contrary, that the subject is constituted through practices of subjection, or in a more autonomous way, through practices of liberation, of liberty... on the basis, of course, of a number of rules, styles, inventions to be found in the cultural environment (Foucault, 1988b, pp. 50–51).

The ‘subject’ can be defined in any number of ways, depending on the philosophical approach taken to ‘being’. For Foucault, the ‘subject’ is both constituted and constituting by the ‘outside’ social system that is at work. A ‘subject’ is exposed to “...someone else by control and dependence; and tied to his [*sic*] own identity by a conscience or self-knowledge” (Foucault, 1982, p. 781). The Foucauldian construction of a subject does not embrace this sovereign, universal position of being (Sökefeld, 1999). The Foucauldian subject is recreated through many social practices and interactions, a range of beliefs/meanings, power-relations and discourses. Ultimately then a Foucauldian subject reflects a multiplicity of possible subjectivities, influenced by social structures and formative contexts. The important distinction to make between this Foucauldian subject, influenced by Greek ethics, and the modernist conception of a subject, influence by Christian ethics, is that Foucault’s subject is for all intense and purposes a function of language; the modernist conception of a subject is one that is sovereign, whereby its words/language are given true, intended meaning by this sovereign subject (Levy, 2001). Furthermore, the Foucauldian subject is aware of its ability to be formed, and to be forming. This becomes important within the notion of subjection.

Subjection of this subject refers to particular, historically-located disciplinary processes which enable us to consider ourselves as individuals, and which constrain us from thinking otherwise (McHoul & Grace, 2007). The subjection of this subject consists of a set of processes that includes: the influence of the discursive processes between oneself and others; and, the technologies of individual domination²³ (Foucault, 1988a, 1993). Discourses and its practice will be considered more thoroughly in the following section; suffice it to say for now that the discourses involved in social interactions reflect historically-located disciplinary processes which enable the subject's social construction. As for the technologies of domination, they are effected via rules and cultural inventions within a specific formative context (Foucault, 1988b). Subjection is then based on difference, as I defined it at the beginning of this section, focused on relationships between two or more effects. These effects are commonly known as cultures, values, practices, rules and the like. Briefly, for example, two effects can be power-relations and resistance. One can reproduce uncertainties of the world, and deal with these uncertainties, by navigating among these power-relations and resistance. The consequence of subjection is a categorization of this 'one' below another, and then this 'one' resisting this categorization in a reverse discourse (Foucault, 1984b, 1984c). Ultimately, this reverse discourse gives rise to resistance norms.

The self and her subjection permit Foucault to ask how a subject is to "tell the truth about itself" (Foucault, 1988a, p. 38). The self also helps him to explain how we recreate ourselves, revealing "patterns that he [*sic*] finds in his [*sic*] culture and which are

²³ Technologies of self-management would also fall into this but technologies of the self takes this further (e.g. Foucault, 1988b, p. 132).

proposed, suggested and imposed on him [*sic*] by his culture, his [*sic*] society and his [*sic*] social group” (Foucault, 1987, p. 123). The subject is then not invented out of nothing; the subject, self-constituted and self-constituting, introduces the techniques of ethics and of self-care (LeCoure & Mills, 2008). These techniques are specifically concerned with “how an individual is *supposed* to constitute himself [*sic*] as a moral subject of his [*sic*] own actions” (Foucault, 1984a, p. 352, emphasis added). Ethics specifically brings into this concept construction the experiences of the social into this recreation of the self. Ethics and self-care also bring in the autonomous ways, through practices of resistance and of liberty, that the subject enacts the social (Foucault, 1988b).

The subject and her subjection are therefore defined by the active constitution of the self, where the subject is in a state of becoming that is self-regulating, influenced and limited by power-relations, discourses, rules, and formative contexts. The subject can also be reshaped in these social interactions in such a way to conform to the creative needs that may be while also having a potential for resistance (Hutton, 1988). There can be any number of possible subjects, with any number of possible choices that are influenced by social structures that can repress.

Technology of power-relations

The technology of self cannot, and does not, operate alone. I turn now to the technology of power-relations that works with this understanding of the self. Grandy (2007) presented a taxonomy of the four dimensions of power that allowed me to, first, gain a better understanding of what is meant by power and, second, to contrast the one-dimensional and the four-dimensional models of power to illuminate this notion of power-relations further. The one-dimensional model of power (Grandy, 2007) is

concerned with the exercise of power in decision-making and in conflict, where this power exists, and the scope of power. The two-dimensional model of power (Grandy, 2007), or the two faces of power theory, considers where power is present in both non-decision and decision making situations. The three-dimensional power model (Grandy, 2007) talks to the existence of power even in situations of non-conflict where individuals and groups accept certain situations as the way things are. The three-dimensional model is focused on the resistance of the marginalized and the hegemonic way of organizing. In addition, this three-dimensional power model asks us to answer the question “what has prevented conflict from occurring in the first place?” (Grandy, 2007, p. 396). Finally, the four-dimensional model of power conceives power as a network of social relations and discourses where power emerges from relations that unsettle accepted realities (Flyvbjerg, 2012; Grandy, 2007).

Comparing two extremes along the power spectrum can reveal more clearly one of these extremes. For this reason, the one-dimensional power model is presented here in more detail as a way to bring to light the four-dimensional model of power. The one-dimensional power model, the most referenced and used concept in the organizational academic literature (Grandy, 2007), addresses power as an entity or as something that can be possessed. The central interests within this model are: possession of power, sovereignty over power and others, attempts to eliminate or minimize opposing forces, and the end result of power and its localization (Flyvbjerg, 2012; Fraser, 1989). Power in this model is defined as the "ability to get others to do as you want, against their will, or to do something they would not otherwise do" (Grandy, 2007, p. 398). The Habermasian (1984) concept of power resides in this construction. Habermas' power is accorded

through judicial and legislative means. Those academics that follow this construct are concerned with who has the power in a ‘top-down’ sense, and what ‘it’ is. Habermas’ goal, via legislative means, was to regulate power through rational norms and procedures in such a way to address those that have power and abuse that power for unstated means (Flyvbjerg, 2012). The question of legitimacy of power versus illegitimacy of power is central within this treatment of power (Fraser, 1989; Grandy, 2007). The difficulty with Habermas’ power as an entity concept is that the concept does not address how exclusion of another is exercised as a practice by those that possess power. It also does not help to identify how barriers are created along the way and, ultimately, how to eliminate those barriers. If I were to embrace the practice of power as a process then the issue of power-relations among individuals could not be studied or addressed.

The Foucauldian concept of power-relations resides in the four-dimensional power model. This power model is concerned with a multiplicity of forces emanating from various sources which are conflicting and contradictory (Grandy, 2007). Foucault’s power construction, which exists locally in the day-to-day interactions, is continuous and productive. Power-relations are “...multiple; they have different forms, they can be in play in family relations, or within an institution, or an administration – or between a dominating and a dominated class power relations” (Foucault, 1988b, p. 38). Power-relations are also “capillary” (Fraser, 1989, p. 22) in the sense that power circulates throughout the entire social body down to the smallest practice. These practices include such things as a glance, a tone of voice, body language, etc. Power-relations also "traverse and produce things, it induces pleasure, forms knowledge, produces discourse " (Foucault, 1980, p. 119). They can be deployed in discourses across the social.

Foucault does not define power as entity in a substantive sense. Unlike Habermasian power, power-relations cannot be possessed. The fourth-dimension of power model is not concerned with controlling power, as it was in the first-dimension model; the fourth-dimension model requires that power-relations be revealed in such a way to generate new understandings within a social reality. This conception of power-relations identifies critical areas in the day-to-day and mundane interactions between and among individuals, where areas for change can be incorporated to transform an organization (Fraser, 1989). Foucault, through this technique of power, shifts one possible philosophical approach to power by calling for transformation²⁴ to one of resistance as a series of localized strategies (Foucault, 1988b). Essentially, there is no “law of all or nothing” (Foucault, 1988b, p. xv); there is a "coordinated cluster of relations" (Foucault, 1980, p. 199). The relations of power do not have as a function to repress and prohibit. They can however be disciplinary in nature since they can create order and establish boundaries (Talbot, 2010).

Foucault, with his technologies of power-relations and of the self, sought to understand how power shapes our knowledge of the self as opposed to how knowledge gives us power (Hutton, 1988). Subjects, Foucault argued, shape and reshape the social via ideologies, discourses, knowledge, etc., in such a way to be able to conform to the present creative needs (Hutton, 1988). Subjects are not shaped via ‘Power’, with a capital ‘p’, such as by kings or a God-like entity. The multiple forms that a subject can take on are reshaped via webs of power-relations, of day-to-day social interactions. The

²⁴ Sartre on the other hand, and to contrast against Foucault’s technology, called for all-out revolution and global transformation.

generative force of power-relations has a potential for positive action in the creation and recreation of a subject.

Technology of discourses/knowledge

Discourse has many possible definitions that cross many spectrums and that can contradict each other. From social linguistics, discourse can be considered in terms of text or text grammars, where text is the written and spoken word. Critical linguistics look at texts as socially classed artifacts that exist within an historical context (McHoul & Grace, 2007). Empirical approaches used by critical linguistics consist of looking solely at human conversation and at the interplay of such things as interruptions in speech and the interaction between those that are conversing. The utopian universalistic theory of discourse (Flyvbjerg, 2012) was concerned with how to go about discourse, found in procedures that were to be followed for the "rationally motivating force of the better argument" (Habermas, 1984, p. 42). Foucault's concept of discourse, in contrast to these definitions, is characterized as a critical lens that looks to conflict, and to power-relations, as a counter position to social conditions (McHoul & Grace, 2007). This characterization of discourse is historically situated within a system of power-relations that constitute objects and subjects (Fairhurst & Putnam, 2004).

The important distinction across this spectrum of definitions, from the micro to macro and those that mix of micro-macro, is that Foucault's macro concept of discourse does not refer to language or how individuals use language (such as measuring interruptions in a conversation) with a goal of establishing a theory of language, utopian or otherwise.

Foucauldian discourse, and its analysis, are rather related to mundane social life²⁵, to social knowledge creation and recreation. Discourses, within Foucault's *régime des pratiques* as captured by Perrot's (1980) interview with Foucault, go beyond language, texts and semiotics. Discourses are sets of practices that bring an object, or set of objects, into being (Parker, 1992). These discursive practices specifically encompass "everyday attitudes and behaviour [*sic*], along with our perceptions of what we believe to be reality" (Grant, Keenoy, & Oswick, 1998, p. 2).

Discursive practices can be found in social processes which can have the following interrelated, but not discrete, elements: productive activity, means of production, social relations, social identities, cultural values, consciousness and semiosis (Fairclough, 2001). A social reality that is created and recreated via discourses compels the focus of analysis to be on the interactions among individuals in a social reality. This focus then eschews the notion of a social reality as a 'container' as Smith (1993) characterized. Discourse, in terms of knowledge, is more a matter "... of the social, historical and political conditions under which...statements come to count as true or false" (McHoul & Grace, 2007, p. 29). Discourse, and its practice, is then a social construction imparting knowledge, linking power-relations to a dynamic and changing environment, playing a key role in recreating the self and her subjection.

The Intersectionality Literature

The literature review thus far focused on feminisms, the poststructuralist perspective and Foucault's technologies, assisted me in gaining a better understanding of my

²⁵ Social life refers to the "interconnected networks of social practices of diverse sorts (economic, political, cultural, family and so on)" (Fairclough, 2001, p. 27).

ontological and epistemological beliefs. The complexities of what a self ‘is’ and what she ‘can be’ eluded me still. I started asking questions about identity and how complex the self could be, and ultimately how I could reconstruct, and gain a better understanding of, the self. These questions led me to intersectionality scholarship, on what this scholarship has said so far, and what is missing within this body of knowledge.

Identity and the Foucauldian Subject.

The notion of identity comes to us via many different schools of thought. These schools include philosophy, psychology/psychoanalysis, sociology, modernism, postmodernism/poststructuralism, etc. The historical starting point for the study of this meta-concept could, in theory, play a role in gaining a better understanding of what identity is and is not. I believe that identifying this starting point is, however, beyond the scope of this study; similarly, as a poststructuralist, points of origin are counter to how we construct history. That is, a poststructuralist embraces that history is fragmented and non-continuous; as such, there can be no point of origin (Levy, 2001). I then specifically chose to maintain a focus on the poststructuralism lens while also considering the sociological influences of the study of identity. In this way, I could gain a better understanding of what the concept of identity is, and of the relationship between identity and the Foucauldian subject.

The central idea in sociological studies of identity, that parallel the poststructural approach, is social interaction. Social interaction is considered as the relationships among individuals that creates the self and the mind (Anderson, 2016). The social world and the social individual interact together, mutually constituting each other in the processes of the everyday interactions. This social-interactionist perspective, which would later become

symbolic interactionism (Anderson, 2016), embraces a social world that is always evolving and how individuals are shaped by that social world. This implies that the social individual is also always evolving, and being reshaped, and, importantly, doing the reshaping in the social world. This perspective is in contrast to Erikson's (1963, 1964, 1968) work on 'who I am'. The Eriksonian identity concept had a centrality to it, where 'sameness' or 'selfsameness', within an individual, and its continuity were the focus. There was stability and fixedity to this Eriksonian identity construction, that was independent from the dynamics of social interaction. Symbolic interactionists, such as Mead (1932, 1934), were very much interested in "social interaction, mediated through shared symbolic systems" (Gleason, 1983, p. 917), and of how the self can be shaped, and influenced, into being.

The self, according to Mead (1932, 1934), is constructed around a sense of identity that we each possess as a result of social activities and events. This self arises via our capacity to use language, to assign meaning to the narratives of the everyday, and then to reconstruct an image of ourselves in light of these interactions (Anderson, 2016). Mead went further, breaking out the self into the 'I' and the 'Me': the 'I' represents the "response of the organism to the attitudes of the others, representing a direct line of action taken by an individual" (Anderson, 2016, p. 178); and, the 'Me' is "the organized set of attitudes of others which one himself [*sic*] assumes" (Mead, 1934, p. 173). The 'I' then represents a sense of becoming, while the 'Me' represents a sense of the past, and of making sense of that past. The self, constructed from this 'I' and this 'Me', is created and recreated from this continuous search for "adjustment and adaptation" (Anderson, 2016, p. 179).

Interestingly, Foucault's technology of the self, presented previously, underscores that individuals are in a state of being. This state of being is reshaped and recreated, through discourses and power-relations experienced in social interactions. He referred to the "temporal identity" (Foucault, 1972, p. 131) and the discontinuities - unstable, flexible, and mutable – nature of the social, among the self and others, throughout his works. In this state of creating, and recreating, our state of being and of becoming (Hall, 1990), the fragmented, discontinuous story of 'who we are', and of our positioning in those social interactions, becomes part of a fascinating narrative on the self and on identity. The Foucauldian self, or a Being, is not the same notion as identity. The self is constructed and reconstructed, via discourses and power-relations, assuming a host of identities that represents, and gives meaning, to that self. Foucault, with respect to the self, was ultimately concerned with "the category 'subject' [which] is itself determined by a particular configuration of epistemological space" (Levy, 2001, p. 103). The epistemological space, for this study into STEM-professional women (a Being), is represented by the political episteme of identities. The difference between the self and identities is subtle, but nonetheless important. To better understand this stance, the inevitable question of 'So what?' must be considered. I turn to this question in the next section.

The Sociological Perspective on Identity

The concept of identity within the sociological perspective can be constructed along self-identity, social-identity, and identity work. These are key elements to the multiple positions that the self can be (re)constructed from. These identity concepts, within a poststructural treatment, were discursively and graphically reproduced earlier in Figure 6.

The self, recall, is in a state of being and of becoming that is self-regulating, influenced and limited by social value norms, and by rules. The self is reshaped and recreated within the social while also having the potential for resistance (Hutton, 1988).

Self-identity is the “notion of who he/she is becoming” (Corlett & Mavin, 2014, p. 262). This concept permits us to look at self-perception with respect to ‘who I am’ as ‘I’ see. Clair, Beatty, and MacLean (2005) described self-identity as visible characteristics such as race, cisgender, ethnicity, sex, age, physical appearance, and language. This grouping of self-identities along these visible characteristics ignores, unfortunately, the internal effect of social influences, and that not all self-identities are visible. A man, for example, may decide to wear a pink shirt one day. Does this classic feminine-cisgender color mean that this man is a cisgender woman, as a self-identity? Not likely. In Figure 2, I presented my perception of ‘who I am’ as being a French-Canadian. I embrace and reflect on this self-identity wondering, at times, if I should state and share this self-identity. This reflection on my self-perception of ‘who I am’ depends on the social world I find myself in. For example, June 24th is the Saint-Jean Baptiste holiday in Quebec, a nationalist cry for the *Quebecois* (masculine)²⁶ to embrace their independent status. In this milieu, I would not state that I am French-Canadian, but *Quebecoise* (feminine) to avoid possible political and bodily harm. While my discourse is different, I am still reflecting my cultural heritage as being part of me, of who I consider myself to be. It is also, importantly, not a visible characteristic. I would have to tell you that I consider myself this way. This narrative is also an example of a resistance discourse; I choose to

²⁶ Typically, the masculine is a discursive norm used in French to embrace everyone in society.

politically name this self-identity, my perception of myself, to fit into a social world with its own cultural norms and rules that I have learned to navigate.

Social-identity consists of ‘inputs’ into this self-identity (Watson, 2008). These ‘inputs’ are socially constructed such as in ideologies; that is, an experience, history, and position in society that is external to and coercive to the individual (Anderson, 2016). Stories, such as narratives of a particular social categorization, and attachments, such as emotional involvements, can also be considered ‘inputs’ (Ashmore, Deaux, & McLaughlin-Volpe, 2004). Social-identities can be manifested in discourses and this, just as with self-identities, via interactions with others. Clair et al. (2005) named these social-identities as non-visible characteristics. These characteristics can include occupation, national origin, social group membership, age, sexual orientation, religion, skin colour, income-class, etc. (Simpson, 2009). Returning to Figure 2, I shared that my occupational social-identity was ‘Life Sciences Mission Manager’. This social-identity reflects a position in society; that I am employed, that I am STEM-trained and knowledgeable, that I have been socially categorized within the space industry in this way. The difference between self-identity and social-identity, in the two examples centered on ‘who I am’ and ‘who I am becoming’, is that my self-perception is one of being French-Canadian but I have been assigned the identity of ‘Life Sciences Mission Manager’ by an organizational structure that says this is ‘who I am’. I do not believe that this is ‘who I am’ though; I am merely reflecting what the social world is telling everyone ‘who I am’ supposed to be.

Identity work acts at the nexus of self-identity and social-identity, where “people...are both making connections ‘outwards’ to social others as well as ‘inwards’ towards the self” (Watson, 2008, p. 140). Identity work is essentially meaning-making,

which Mead (1934) captured within his construction of 'Me'. Today, Weickian sensemaking, introduced in Chapter One, addresses meaning making independently from this Meadian 'Me' identity construction. Chapter Four, focused on critical sensemaking, takes meaning-making a few steps further than Weick's construction, and is reflective of this notion of identity work.

There is one key point that must be underlined at this time. The implication in using socially varying self- and social-identities has important implications for the identity categories of race, ethnicity, and cisgender. There has been much confusion with regard to these categories within the identity and the practitioner literature (Gleason, 1983; Sökefeld, 1999). The assumption is invariably one centered on the stability and centrality of these particular identity categories (Van Laer & Janssens, 2014) in spite of the symbolic interactionist work done which assumes the ephemeral states of identity. Some call for replacement of the race category with the ethnic category (Phinney, 1996), while others call for race to be treated as an independent variable implying its stability (Helms, Jernigan, & Mascher, 2005). These debates around identity stability versus identity change/fragmentation also extend to other identity categories including cisgender (Butler, 1990). If one embraces the variability of social interactions and the variability of constructing the self, then cisgender, race, and ethnicity must also be variable, discontinuous, and part of the social.

What has the intersectionality literature said about identity?

The beginning of intersectionality scholarship, and 'what' it is, and 'how' it is used, are sites of debate in the literature. Instead of embarking in these arguments, I will simply state that it has been grounded in the idea of inserting the Black woman as a theoretical

wedge into ‘traditional’ (read White) feminist work (Nash, 2008). As such, there are important influences to intersectional scholarship from critical race studies (e.g. hooks, 1981; Hull, Scott, & Smith, 1982; King, 1988; The Combahee River Collective, 1979). Often the theoretical wedge was recognized under such terms as ‘jeopardy’, ‘double jeopardy’, ‘triple jeopardy’, or ‘multiple jeopardy’. Crenshaw (1989, 1991) introduced the term ‘intersectionality’, a name built on the varied identity and intersecting systems of power research done in the 1970’s and the 1980’s (Collins, 2009), as a way to examine, and bring to the forefront, the interaction of race and cisgender, and the resultant discriminatory social order. She presented intersectionality as one possible way to recognize both power-relations and knowledge creation as co-existing together for the particular case of Black women’s experiences in the workforce (Crenshaw, 1989) and of women of minority status who were subjected to violence at home (Crenshaw, 1991). Her approach, along with others such as Collins (2000) and Yuval-Davis (2006), to intersectionality was from a feminist (structuralist) standpoint and a (neo)-Marxist ontology²⁷ (Carbin & Edenheim, 2013). These studies all added important knowledge to the theory building surrounding the marginalization of Black women (Cohen, 1999). To be marginalized was a condition where there “...(was) deficiency in the economic, political, and social resources used to guarantee access to the rights and privileges assumed by dominant group members” (Cohen, 1999, pp. 37–38). Thus, intersectionality

²⁷ Collins and Bilge (2016) point out that Crenshaw’s work of analysis was focused on narrative traditions and truth-telling, linking it loosely to poststructuralism. My goal here is to show that some might think Crenshaw’s intersectionality is poststructural. Crenshaw herself points out that her work embraces structuralism (Cho et al., 2013).

research began as a way to examine Black women's experiences, but as noted above, it has now moved beyond this focus.

There are, to date, a multitude of possible understandings for what intersectionality is and is not. Crenshaw's (1991) theoretical stance has been to argue for a real-life recognition of multiple oppressed (i.e. interdependent cisgender, ethnic/raced, class, etc.) individuals who must function under one disciplinary (justice) factor. Collins and Bilge (2016) define intersectionality as a way to reframe narratives focused on identities as an integral part of politics. In particular, they divided intersectionality down into six component parts. This is the first time that such a succinct and clear explanation of intersectionality has been provided; however, it took them a full book to address each component. These intersectionality components are summarized in Table 2, using some of Collins and Bilge's direct quotes, as a way to define these core concepts.

Table 2: Core Concepts of Intersectionality

Core Concept	Collins and Bilge (2016) Quotes that Best Define the Core Concept
Inequality	“Inequality of income and wealth” (p. 14) “Social divisions of race, gender, age, and citizenship status, among others, positions people differently” (p. 15) “Experienced human rights violations” (p. 96) “Oppressed people” (p. 129) “Capitalism, colonialism, racism, patriarchy, nationalism” (p. 200)
Relationality	“Rejects ‘either/or’ binary thinking...(shifts) to examining their interconnections.” (p. 27)
Power relations	“People’s lives and identities are generally shaped by many factors in diverse and mutually influencing ways” (p. 26) “Power relations are to be analyzed both via their intersections, for example, racism and sexism, as well as across domains of power, namely structural, disciplinary, cultural, and interpersonal” (p. 27)
Social Context	“Examining intersecting power relations in context...(which) means contextualizing one’s arguments, primarily by being aware that particular historical, intellectual, and political contexts shape what we think and do” (p. 28)
Complexity	“A way of understanding and analyzing the complexity in the world” (p. 29) “Attending to how intersecting power relations shape identities, social practices, institutional arrangements, and cultural representations and ideologies in ways that are contextualized and historicized introduces a level of complexity into everything” (p. 202-203) “a rich tapestry of scholarship” (p. 203)
Social Justice	“Typically critical of, rather than accepting of, the status quo” (p. 30)

In between Crenshaw, and Collins and Bilge, we have Syed (2010) and Cole (2009) who both acknowledge the roots of intersectionality. They refer to Crenshaw’s (1991) tool for analysis, as a way to better understand structural oppression based on a consideration of multiple categories of social group membership. This positioning mirrors Prasad and Prasad’s (2002) “dominant-group/marginal-group dynamics” (p.61) and Bhabha’s (1994, 2000) concept of hybridity in postcolonial theory. Syed contrasted this with the everyday

role ‘awareness’ of intersecting identities along with the role of gradually unfolding intersecting identities over time (Azmitia, Syed, & Radmacher, 2008). Cole (2009), on the other hand, talked to the need for an ‘articulation’ of intersectionality that goes beyond the race-class-cisgender mantra (Fine & Burns, 2003), allowing intersectionality to look at not only disadvantaged groups but also privileged individuals such as middle-class Black or White women. The call to study the ‘privileged’ identities was mirrored by Nash (2008) who asked for “...a progressive scholarship [which] requires a nuanced conception of identity that recognizes the ways in which positions of dominance and subordination work in complex and intersecting ways to constitute subjects’ experiences of personhood” (p. 10). Intersectionality scholarship then straddles many different identities, social positions, and exclusionary practices.

Intersectionality has grown from these initial ‘truths’ based, in part, on the counter argument that the theory of marginalization was essentializing the Black woman into a poor, un-educated, abused oppressed individual (Levine-Rasky, 2011). Moving beyond the cultural and social determinism of the Black woman, intersectionality expanded to embrace other intersecting identities via what Nash (2008) called a generalized theory of identity. The treatment of intersectionality within this generalized theory of identity included work in the theoretical realm of postmodern and poststructural studies (Acker, 2006; Davis, 2008; Staunaes, 2003), psychology studies (Cole, 2009), transnational/postcolonial studies (Mohanty, 1988; Prins, 2006), disability and sexuality studies (Thomson, 1997); and, lesbian/gay/bisexual/transgender studies (Moraga & Anzaldúa, 2015). The theoretical work in this expanded social ‘theoretical wedge’ laid the groundwork for empirical work to strategically test and build knowledge of

intersectionality. Qualitative and quantitative empirical studies are now found in areas such as: feminist studies (Torres, 2012); studies of men (Hearn, 2014); ethics (Van Herk, Smith, & Andrew, 2011); educational studies (Naples, 2009); transnational/postcolonial studies (Calás et al., 2013; Mohanty, 1988; Van Laer & Janssens, 2014); and, lesbian, gay, bisexual and transgender studies (Bowleg, 2008; Stone, 2006).

Intersectionality now includes various, complex, and shifting interactions of self- and social-identity formations, such as cisgender, race, sexuality, etc.²⁸, where multiple identities co-exist and constitute each other (Davis, 2008; Zack, 2005). Intersectionality also includes power-relations flowing through and among discourses in an individual's personal and professional life (Davis, 2008; Knudsen, 2006), growing this knowledge from Collins' (2000, 2009) ground-breaking work. Historical discursive fragments, revealing the intersecting self- and social- identity creations and recreations, are similarly now part of this intersectional scholarship (Ruel, Mills, & Thomas, 2015). Intersectionality within the generalized theory of identity thus can assist in revealing key concerns; namely, the existence of a multiplicity of power-relations, of the interlacing of social dynamic categorizations based on cisgender, race, and ethnicity, and of the exclusionary order that results (Lykke et al., 2014).

The problem remains, however, of how to meld these changing and multiple constituting and intersecting identities such that Lykke's (2005) intersectionality thinking does not hide biased assumptions. In an attempt to address this issue, taxonomies of various intersectional research streams, for example Crenshaw (1989, 1991), Choo and

²⁸ Recall that fourteen possible identity categories were identified by Lutz (2002) and were captured in Chapter 1, footnote 1. I continue to only identify three categories with an 'etc.' at the end.

Ferree (2010) and McCall (2005), highlight that a universal convergence towards a ‘nodal’ point of intersectionality thinking is not something that we should strive for. Specifically, Crenshaw (1989, 1991) presented three types of intersectionality analysis based on a structural ontology: structurally focused on the intersection of race and patriarchy; politically focused on the intersection of anti-racist and feminist organizations; and, representationally focused on the intersection of stereotypes. Choo and Ferree (2010) categorized styles of intersectionality based on a sociological perspective: group centered which considers multi-marginalized individuals; process centered where power is relational and of multiple oppressions; and, system centered which looks for interactive and complex associations of inequalities. McCall (2005) captured the categorizations of some intersectionality research, creating the intercategory, intracategory and anticategory approaches as a way to include both works that are clearly intersectional in nature and those that are not. McCall’s (2005) intercategory approach specifically centers on the comparison of the “relationships of inequality among social groups and changing configurations of inequality along multiple and conflicting dimensions” (p. 1773). This comparison moves researchers away from a master demographic category such as ‘Woman’ towards a consideration of multiple and shifting identity dimensions. These shifting dimensions are due to power-relationships that (re)create an individual along with a consideration of the institutional levels that binds these individuals together (Glenn, 2000).

With respect to the six core concepts of intersectionality identified in the table above, power-relations and complexity of an individual were addressed earlier in this chapter, under Foucauldian technologies of power-relations and of the self, and via the sociology

definition of identities. Social context was addressed in Chapter Two, forms of context, focused on rules, meta-rules and social values of the Canadian space industry. Inequality will be addressed in Chapter Four, forms of experience, as the experience of exclusion. Social justice will be addressed in Chapter Eight and Nine. This leaves the concept of relationality which is not as clearly framed within the academic literature. Specifically, I found that in certain circumstances relationality is a hidden assumption, while in other cases, it can be incorrectly used. Relationality is best considered within the anchor point concept which I turn to now.

Relationality and Anchor points.

Recalling Foucault's construction of the self, a subject is persuaded into existence as a self-regulating subject where this self is not a 'one' or an identical subject (Sökefeld, 1999). This self is a product of the relationship among power-relations and discourses. Foucault ignored, or did not address, the various identity categories (i.e. cisgender, race, ethnicity, class) and their interdependent, constituting nature in this construction of self. He did study differences of power-relations and resistance norms. However, in the construction of the self, he did not address how to study a resultant order that can be (re)created when interdependent identities are at play.

The relationality concept offers another way of considering Foucault's 'differences'. The relationality concept can be constructed by women and men of varying ethnic and racial backgrounds (Friedman, 1995) with a goal of looking at relationships between different phenomena. Relationality considers "...identity as situationally [*sic*] constructed and defined and at the crossroads of different systems of alterity and stratification" (Friedman, 1995, p. 17). The idea behind relationality is to remove the 'either/or' binary

of studying individuals (Collins & Bilge, 2016). In other words, we are urged to move away from men versus women, White versus Black, poor versus rich characterizations of a social order. This is done in such a way to move towards interconnections (Collins & Bilge, 2016). Relationality is also dependent on power-relations, in the day-to-day, mundane interactions among individuals, and can be both productive and disciplinary. Relationality can also be constructed via discourses of “accusation and confession” (Friedman, 1995, p. 7).

The anchor point concept, first introduced by Glenn (2004), was based on a construction of relationality whereby she saw Black and woman as identities that gained meaning in relation to each other. This meaning was nebulous however, depending on the power-relations that were at play. In Glenn’s original definition, she constructed the anchor point as being in hierarchal opposition: so, White was the dominant category over Black, and Man was cisgender-less in relation to Woman. Furthermore, her use of relationality included the bond of occupational identities that an individual may take on, such as housekeeper responsibilities. Creating an anchor point – a Black housekeeper woman – according to Glenn then secured meaning in such a way that we can consider the order that is (re)created through this meaning. In other words, this anchor point positions this individual below someone else. Anchor points then allows us to consider the consequences of this positioning, and of her Otherness in a social reality.

Anchor points, to be clear, are not ‘just’ identity categories as they include relationality. They specifically secure meaning for a brief period of time so that we can reveal the order that is created, and in some instances, that is recreated. The ever present ‘So What?’ question must be considered, and so I turn to this question by first

considering what is missing in the intersectionality literature, before I reconstruct Glenn's anchor points.

So What?

The intersectionality metaphor has proven to be one of the most interesting and popularly-used among diversity scholars over the past three decades (Bendl, Bleijenbergh, Henttonen, & Mills, 2015). There remain important debates, however, around this metaphor, the accompanying theory and its use, resulting in greater theorizations than actual application (Davis, 2008; Hearn & Louvrier, 2015; Mercer, Paludi, Mills, & Helms Mills, 2015). Less than 1% of articles from 1990 to 2009 in three top-tier journals used intersectionality (Allison & Banerjee, 2014). Focusing in on this social constructionism, critical management and intersectionality theme as a sub-field of the (cis)gender and diversity literature (Metcalf & Woodhams, 2012), I consider five specific areas where knowledge is missing and where this empirical research can make a contribution. I begin with diversity, where I present that studying mechanisms of power-relations should be the focus as opposed to questions of organizational performance or organizational needs. I continue with intersectionality, focusing on the need for expanding empirical understandings of intersectionality. I then move to the anchor point concept, where I address the hidden relationality assumption, and how I bring it into the light. I then discuss the depth of analysis that can be achieved using intersectionality scholarship, if only we moved from first person accounts to social interaction accounts. Finally, I consider a specific empirical area that has not been addressed in the intersectionality literature, namely the economically-privileged, highly-educated Other.

Diversity: From an academic/practitioner perspective on diversity, the diversity concept was constructed based on utilitarian/functional and equality diversity definitions and their application (Simons & Rowland, 2011). These equality and functional/utilitarian diversity definitions were used by academics and industrial practitioners alike as justification for diversity management initiatives. More specifically, functional/utilitarian diversity was concerned with organizations gaining efficiencies and increasing effectiveness towards achieving increased organizational performance (Guzzo & Dickson, 1996; Horwitz, 2005). The argumentation that can typically be used, following this application of diversity, touches upon such things as the far-reaching implications and risks, within the space industry, that cause significant costs to the organization. Perhaps the best known examples of these risks and social costs within the space industry were represented in the research into the Challenger and Columbia space shuttle disasters. This research demonstrated that there were significant management risks, including loss of life, associated with the existing masculinist-dominated hierarchy (Maier, 1997). Equality diversity, on the other hand, was defined as a diversity based on morality and a person's intentions/behaviors (Van Dijk, van Engen, & Paauwe, 2012). The argumentation that accompanies this definition would showcase motivation. For example: a key question of the future development and exploitation of space was dependent on how we motivated and encouraged the next generation to go into science and engineering; to be the innovators of the future. These scientists and engineers needed to know that a future within this industry was a possibility for them. When people were treated in an inclusionary fashion, differences were celebrated and embraced so that a

person's potential was achieved and this to the fullest extent possible for the benefit of the organization.

However, as Ahonen, Tienari, Merilainen, and Pullen (2014) ask, is the motivation for ethical and moral practices to be based only on organizational performance or organizational needs? A study into power-relations, and how discourses/knowledge were created and recreated, goes to the heart of the social. I believe that the removal of taken-for-granted assumptions, and/or biases, can only occur if you look at those assumptions, expressed via discourses which become knowledge. Instead of measuring diversity or equality outcomes, I am focused on contributing to the central diversity discourse; namely, studying the mechanisms of power, and how knowledge is created and recreated that results in the Other, and in their movement to the periphery. Moving individual's away from a need for exclusion towards something new is the goal of diversity discourses; however, very few studies have been able to achieve this goal.

Intersectionality: This scholarship has the potential to help cisgender and diversity scholars move away from a monolithic First World, White-only feminist metaphor into a recognition of a multiply-positioned individual and their lived reality (Davis, 2014; Lykke, 2014). However, the apparent vagueness and inherent complexity of the intersectionality concept has contributed, in part, to its lack of use (Davis, 2008). The numerous meanings attributed to the metaphor can reflect different theoretical concerns (Choo & Ferree, 2010) thereby adding to endless "metatheoretical contemplations" (Bilge, 2013, p. 405). Notably, intersectionality has been characterized as: contributing to the theory of marginalization; being an analytical tool; being a universal convergence; or, contributing to the generalized theory of identity. Where the literature is clear is that there

remains important work still to be done with respect to the marginalization of the Black woman. Many authors have focused on the underprivileged Black woman who has experienced human rights violations. My co-authors and I have added to the empirical intersectionality literature focused on the privileged-highly educated-Black woman who experienced social divisions with the NASA work force (Ruel, Mills & Thomas, 2015, 2018).

With this empirical study, I specifically chose to embrace intersectionality within the generalized theory of identity so that intersecting identities, and the accompanying power-relations involved, could include the Black woman, the White woman, the Asian woman, etc., such that they could all be the theoretical, and the empirical, ‘wedge’ within the White-only feminist work. Bilge (2013) and Collins and Bilge (2016) railed against the apparent appropriation of intersectionality for what they perceived as feminisms that have historically been concerned only with the White woman, which can be found in the generalized theory of identity. I struggled with their arguments: could I ‘use’ intersectionality in the White-dominated Canadian space industry? What if all my intentions to have a diverse sample failed? Would I, as a result, be appropriating a concept with important roots in the Black women’s movement? After much internal strife and presenting my empirical work on Ruth Bates Harris at various conference venues, I came to the realization that I would try to have a diverse sample but that, in the end, I would be adding to empirical understandings of intersectionality. Ruth Bates Harris’ story needed to get ‘out there’; but so did other women’s stories in the space industry. The empirical needs of intersectionality are an area that sorely is in need of being addressed. I also decided that this research effort would not be the vehicle for focussing

on theoretical debates of what intersectionality was, is, or is not. I could address the debates, but I would not come down on one side or another. I could also address hidden assumptions that I felt needed to be brought to light, as I will do with the relationality concept, but I would not draw a line in the sand as to what is ‘right’ and what is ‘wrong’ for intersectionality scholarship.

Anchor points concept: The intersectionality metaphor contributes to seeing the world in a different light where the complexity of an individual and the questioning of the status quo are expected. However, some of the underlying assumptions within this metaphor are hidden. Until very recently, for example, I had not seen intersectionality so succinctly defined as Collins and Bilge (2016). Discrimination, marginalization, and exclusion are not just a woman versus man issue; neither are they just a Black versus White versus Asian hierarchical relationship. I admit it is difficult to not fall into this trap of binary relationships; I’ve used contrasting ways of presenting concepts in this chapter such as in the first dimension of power versus the fourth dimension of power. The relational concept as used by Glenn (2004) in her creation of anchor points unfortunately adopted binary contrasts creating a hierarchical opposition of man versus woman, Asian versus White, etc. While I am not the first to acknowledge that her work is very important, I could not let go this construction of ‘accusation and confession’ in light of my understanding of power-relations that can be productive. A reworking of the anchor point concept needed then to reflect a new narrative, one that is based on looking to problematize power-relations among individuals but not as an accusation. By clearly stating the first level assumptions within the anchor point concept, by looking for the hidden meaning(s) within this concept and considering new political discourses to rebuild this concept, and

by not seeking a one-size-fits-all universal ‘convergence’ of intersectionality thinking, I believe I can rebuild the anchor point concept to one that doesn’t revert to either/or binaries.

Depth of analysis: While I cringe at using ‘depth of analysis’, I can’t ignore that this is another area of concern. Many empirical studies, both quantitative and qualitative-based, (e.g. Rakovski & Price-Glynn, 2010; Sanchez-Hucles & Davis, 2010; Wing, 1990) have been focused on first-person accounts of perceived marginalization, oppression or domination²⁹. The lack of insight into social-identity creation and recreation compounds the difficulty in moving away from an Eriksonian identity difference-sameness argumentation. Unfortunately, I have to recognize that this type of argumentation has often been used in domination/oppression studies to the exclusion of other possible arguments (Shields, 2008). The creation and recreation of an individual via self- and social-identities, and anchor points, reveals both the complex individual, and what we ‘know’ of this individual. For example, the STEM-professional woman has an extensive range of possible anchor points such as being cisgender, highly-educated, middle-classed, along with race and ethnic identities. This range, as well as how they come into being and how they can change adds depth to the intersectionality literature that is currently missing (Cho, Crenshaw, & McCall, 2013; Crenshaw, 1991; Davis, 2014; Ko, Kachchaf, Ong, & Hodari, 2013; McCall, 2005; Thomas & Davies, 2002). I am therefore adding an important facet to organizational diversity and cisgender scholarship.

²⁹ This statement does not negate the existence of an important body of knowledge on group identity and hybridity from postcolonial studies (e.g. Bhatia, 2007).

Privileged individual: The STEM-trained woman, as Powell (1999) argued with respect to White STEM-trained women, was, and continues to be, in a privileged economic status with a level of autonomy and freedom with high job demands given their knowledge occupational role (Karasek & Theorell, 1990). Much analysis has been focused on the marginalization of under-privileged individuals – Black women who were neither highly educated nor financially secure (Corlett & Mavin, 2014). This research adds to our understanding of intersectionality with respect to economically-privileged, and well-educated/trained, individuals who are excluded, an area that has been neglected in the literature to date (Nash, 2008). I then capture experiences within a STEM organizational area that is rarely considered (Ko et al., 2013).

Intersectional Feminism

Empiricist and standpoint feminisms presume a universal and unified individual that is ‘woman’. However, when Foucault’s system of practices as norms is considered, the very essence of an individual (or a ‘subject’ within Foucault’s system) is turned on its head. An individual can no longer be considered as a unitary ‘woman’, representative of all women. This ‘woman’ is fractured and fragmented, depending on the power-relations and discourses at play. She is then both in a state of being and of becoming. There is no longer a universal ‘truth’ that is woman, and so, there is no longer a universal victim to power and hierarchies for which feminisms have historically been seen to address. How then to (re)create and study this individual?

Poststructuralism allows a researcher to "think 'the unthinkable', to move, as it were, 'outside the limits', and to consider taken-for-granted knowledge-making operations under very different premises" (Calás & Smircich, 1999, p. 657). Feminist

poststructuralist researchers, embracing the ‘unthinkable’, moved the question surrounding women and their exclusion to that of questioning cisgender texts/discourses. This new focus helped to build an understanding of the social world, and of those individuals in that world, that had not been done before (Calás & Smircich, 1999). Feminist poststructuralists, in particular, narrowed their focus to discursive practices in such a way to be able to reveal and address, some of the power-relations among dominant discourses and discriminatory practices (e.g. Thomas & Davies, 2005) with respect to various women. They, for example, deconstructed binaries (e.g. ‘woman’ versus ‘man’) and deconstructed the body’s relation to cisgender, reaching towards negotiated meanings and political discourses to develop resistance discourses (Lykke, 2005).

This “antiessentialist posture” (Calás & Smircich, 1999, p. 660) permits a different ontological construction of ‘who I am becoming’. Specifically, discursively produced and reproduced identity categories of individual difference, and systems of oppression, figure prominently in this stance. These social unitary categories are unstable in this (de)construction. Intersectional feminism, embracing the poststructuralist perspective and this antiessentialist posture, is a relatively new extension to this notion of poststructural feminism. I say ‘relatively new’ since the literature hints at it as far back as 1994. Abrams’ (1994) in one sentence attempted to separate her deconstruction, antiessentialist legal stance from Crenshaw’s structural treatment of intersectionality, referring to intersectional feminism as being linked to postmodernism. Aikau, Erickson, and Moore (2003) were a little more explicit but still brief about intersectional feminism, linking it to the “third wave” (p. 408) of feminism. They referred to woman’s complex, fluid social reality within an argument of “how power is wielded through gender, race, class and

sexuality” (p. 417). Damant et al. (2008), in their action research on domestic violence, positioned intersectional feminism as “an alternative to radical or postmodern feminism” (p. 128). They acknowledged the importance of (identity) categories that are fluid and shifting, but interestingly link intersectional feminism to women’s social identity as opposed to “women’s individual characteristics” (p. 129). They, similar to Aikau et al. (2003), also talked to the role of power-relations but at “levels” (p. 129) of interaction (individual, systemic, structural). Finally, McKibbin et al. (2015) defined intersectional feminism as a “particular feminist discourse” (p. 101). Specifically, they presented that intersectional feminism embraces a poststructural perspective that moves us beyond ‘just’ the question of cisgender. The complexity of the individual, culturally and bodily fragmented and recreated in discourses, is central to their presentation of intersectional feminism. In practical terms, this means that the constituting, and interdependent nature of our identities (cisgender, race/ethnicity, class, etc.), that are discursively reproduced is the focal point in the political. As McKibbin et al. (2015) conclude, intersectional feminism “hold(s) a notion of subjectivity to be the experience of self as an effect of power and discourse” (p. 101).

Given the relative newness of intersectional feminism, it is difficult to identify in the literature what its key elements and insights are. I consider intersectional feminism to be a lens that embraces the fractured nature of women’s existence. This reflects then the multiplicity of ephemeral identities that is woman. In my research, these identities include self- and social-identities, and anchor points. The focus on cisgender, represented by the ‘feminist’ part of the perspective, is there as a key element. I recognize that by embracing ‘feminism’, I am working counter to some authors who rejected this label

since they believe it works only within “white ideologies” (Collins & Bilge, 2016, p. 76). The intersectional part of the lens reflects the raced/ethnic/sexual orientation/etc. identities of an individual. As I identify this work as embracing Foucauldian poststructuralism, another key element is the need to recognize the relationship of power-relations and resistance. In other words, an individual can reproduce the uncertainties of the world in her discourses, and can also deal with these uncertainties in her own way.

Summary of feminisms, poststructural perspective, and intersectionality literature

I chose to adopt Foucauldian poststructuralism following a close examination of a variety of positions that I could have potentially adopted. First, I examined the empiricist and standpoint feminist body of work, finding critical problems within those feminisms, that I could not reconcile with my lived experience and my acquired knowledge to date. Second, I took a close look at the various feminist assumptions concerning the presumed universal and unified ‘woman’, and the binary oppositions (e.g. men vs women, privileged vs unprivileged economic classes) used to construct their arguments. Again, I found fundamental problems with these assumptions, asking myself if the ability to understand social reality must be based solely on opposition of two cisgender individuals.

The universal ‘woman’ was turned upside down when I found the poststructural lens. Foucauldian poststructuralism permitted me to take on the challenge of deconstructing binaries by looking at power-relations among individuals. The ideas behind Foucauldian poststructuralism were based, in part, on Foucault’s system of practices as norms, as Foucault shared in his interview with Perrot (1980). This system consists of the technology of the self, of power-relations, and of discourses/knowledge. The technology of self addresses the Foucauldian ‘subject’ who was in a state of becoming that was self-

regulating, influenced and limited by rules, values and morals (ethics). The ‘subject’ reshapes and recreates to conform to the creative needs while also having the potential for resistance. The technology of power-relations is concerned with how power shapes our knowledge of self as opposed to how knowledge gives us power (Hutton, 1988). Power-relations flow through the social reality as a generative force relation with a potential for positive action. The technology of discourses/knowledge is available as a social construction imparting knowledge, linking power-relations and rationality together into a rich tableau of interpretative avenues to follow.

The literature review continued with the roots of intersectionality and the contemporary treatment of this metaphor. Notably, Crenshaw (1989, 1991) introduced the term intersectionality as a way to examine and bring forward the interaction of race and cisgender, and the resultant exclusion of Black women. Important influences to this metaphor from critical race studies, from a feminist (structuralist) standpoint, and a (neo)-Marxist ontology framings were also presented. The result of this initial intersectional work was the positioning of the Black Woman as a ‘theoretical wedge’ into traditional White feminist work. Contemporary treatments of this metaphor expanded the definition of intersectionality, leading to a new path of discovery into the domination of individuals. The work accomplished so far was mostly theoretically, with a small number of studies focused on empirical research. One area not yet extensively studied in the intersectionality literature is privileged individuals such as middle-class Black or White women.

The intersectionality literature, via the generalized theory of identity, considered various, complex, and shifting interactions of social-identity formations, such as

cisgender, race, sexuality, etc., where multiple identities can co-exist. The metaphor also includes power-relations flowing through and among discourses in an individual's life. Various taxonomies that group intersectionality-type research were then presented. In particular, I embraced McCall's (2005) intercategory approach given its comparison of the "relationships of inequality among social groups and changing configurations of inequality along multiple and conflicting dimensions" (p. 1773).

The relational and the anchor point concepts added to our understanding of the complexity of individual identities. Anchor points secure meaning for a brief period of time to allow a view into the exclusionary order. The relationality concept, according to Glenn's (2004) interpretation and use, was constructed via discourses of 'accusation and confession'. The initial anchor point concept was based on this conception of relationality whereby Black and woman as identities gained meaning in relation to each other, and that was in hierarchal opposition: so White was the dominant category over Black, and Man was cisgender-less in contrast to Woman. Finally, I identified five areas where I can contribute to our understanding of intersectionality research, namely diversity, intersectionality, anchor points, depth of analysis, and the privileged individual.

Research Framework: Forms of Knowledge (Range of Anchor Points)

The next branch of the research framework is now presented, with a goal of expanding the anchor point concept beyond its initial meaning. This is done by way of embracing the intersectional feminist and poststructural ontology presented in the previous section. Notably, I reached back to Foucault's teachings, embracing his "... bodies of knowledge (discourses) as potentially discontinuous across history rather than necessarily progressive and cumulative" (McHoul & Grace, 2007, p. 4). To achieve this

embrace, I present a genealogy of select Foucauldian technologies along with literature to date on intersectionality, and on the anchor point concept. The research framework challenges me to clarify anchor points.

Just as Phillips and Hardy's (1997) 'refugee' is a concept, so too is the idea of a 'STEM-professional woman'. Educational and industrial institutions, for example, discursively produce the idea of what it is to be STEM, and to be trained, assigning meaning to these ideas that has clearly changed over time (i.e. think of science in the early 19th century and compare it to the 21st century's idea of science). Society also constitutes and (re)produces what a woman is (and is not), discursively idealizing the idea of what it is to be a woman and changing that discourse as we move through time (i.e., women were to stay at home and look after the children in the 1950's while today the idea is that woman must be able to do multiple jobs working in industry and working at home). These ideas – STEM, professional, women - are given ontological being via social-constructed anchor points as shown in Figure 6. The identity concept is one aspect of this (re)creation of the STEM-trained woman along with intersectionality and the anchor point concept. I consider each concept here.

Identity and Intersectionality.

The concept of identity is more closely connected to the self and the individual; it stands at the intersection of self-perception and the perception of others (Hearn, 2002, p. 40)

Identity is positioned in this research along two main theoretical branches: self-identity and social-identity. Self-identity, or the "notion of who he/she is becoming"

(Corlett & Mavin, 2014, p. 262), allows me to consider the how of resistance. Social-identity consists of ‘inputs’ into this self-identity (Watson, 2008). These ‘inputs’ are socially constructed, and manifested in discourses via interactions with others. This social-identity looks to how power-relations play into the (re)creation of the multiple, and ephemeral identities, of an individual, and the meanings gleaned from this interaction. Identity work acts among the connections of self-identities and social-identities. These connections, involved in identity work, are made among individuals, at the level of self-perception, and of the perception of others. Identity work is used in this research to focus on the outside impact on self-identity. So, the tales that others tell about, and the impact of, systems and structures on STEM-professional women is central. This stance is different than to the projection of self-identity outward, or the tales that an individual would tell about their own projected self-identity. This framing allows me to study the complex individual, and their social construction. This social construction is not based just on self-perception but on interaction with others.

The concept of intersectionality embraces the sociological practices as opposed to the legal and structural practices which are hallmarks of Crenshaw’s (1989, 1991) intersectional influential work. Given my intersectional feminist poststructural perspective, and intercategory focus (McCall, 2005), the intersectionality metaphor that was used for this study “take(s) into account the ways in which individuals are invariably multiply positioned through differences in cisgender, class, sexual orientation, ethnicity, national belonging and more” (Davis, 2014, p. 17). What this implies is that the meaning of intersectionality as its own socio-political characterization helps to trace “...how certain people seem to get positioned as not only different but also troublesome,”

(Staunaes, 2003, p. 101). McCall's (2005) taxonomic intercategory approach where the "relationships of inequality among social groups and changing configurations of inequality along multiple and conflicting dimensions" (p. 1773), represents the focus of this framing. These relationships move me to consider the multiple and shifting, self- and social-identity dimensions, among discursive practices. The ever changing configuration of the complex individual must be studied within a specific institution that both binds individuals together and that drives them apart (Glenn, 2000).

The intercategory approach, as McCall (2005) defines it, requires that I identify one primary identity and then I can layer other intersecting self-identities and social-identities. This layering is done in a non-additive fashion, where these identities constitute each other. The non-additive nature is in line with the intersectional literature, where these identity categories do not add as independent categories because this requires a foundational assumption that each individual's experience of their identity is separate and independent.

Anchor point concept.

To understand race and [cis]gender we must examine not only how dominant groups and institutions attempt to impose particular meanings but also how subordinate groups contest dominant conception and construct alternative meanings. (Glenn, 2004, Kindle location 216)

Intersectionality frames the investigation into self- and social-identity. It is not an exercise in determining how many demographic identities – or standpoints – an individual has. If we agree that individuals have many self- and social-identities, how

then can I represent their complexity as being interdependent and as self-constituting? Glenn's anchor points are not 'just' identity categories. An anchor point secures meaning, for a brief period of time, so that someone studying these meanings may consider the order that is (re)created. Glenn argued that we can "...problematize the dominant categories of whiteness and masculinity, which depend on contrast" (Glenn, 2004, Kindle location 163). While talking to her anchor points concept, the precedence of this 'contrast' is built however on discourses of 'accusation and confession' and binary 'either/or' relationships.

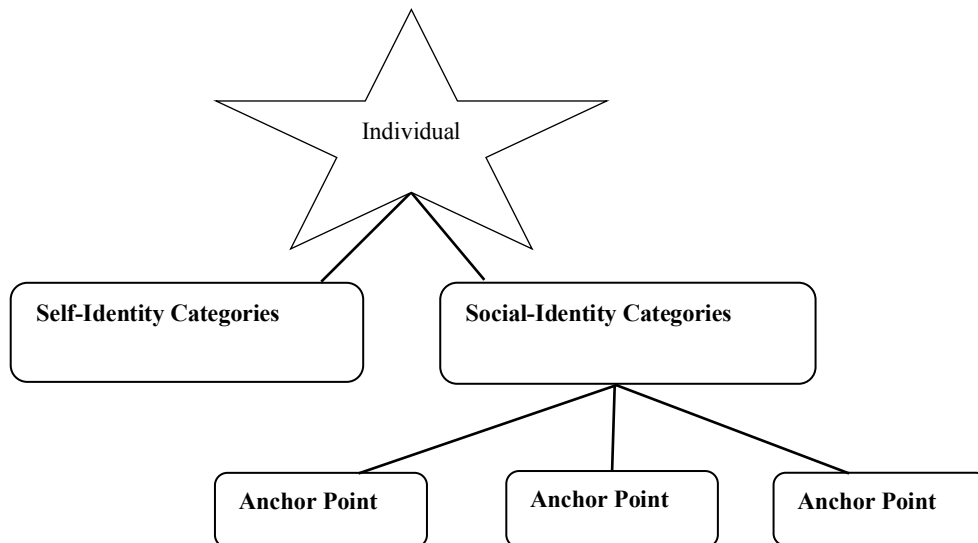
My expansion of Glenn's original anchor points concept must not, and does not, define a difference of men versus women, or a difference of any other "axes of power" (Cho et al., 2013, p. 787). I am not just looking to problematize the White man as a dominant category as an 'accusation'. I am looking to problematize the power-relations and discourses that have (re)created an individual in the everyday social interactions. The varied and ever-changing power-relations among individuals are central to this reconstructed anchor point concept. To be clear, an individual is not merely a victim to anonymous systems of Power, or a victim to discourses of 'accusation and confession'. She is in a state of becoming, via discourses and power-relations, that she is both subject to, and a participant in. In this state of becoming, the reconstruction of her anchor points moves away from discourses of 'accusation and confession'. The reconstruction moves to investigating and analyzing discourses of everyday, mundane social interactions and to the critical sensemaking of these interactions. The anchor point then no longer requires building a generic type that is the norm against which Others are measured (Meyer, 2002). Similarly, this anchor point reconstruction moves the individual type of person

that is simple, fixed and stable acting alone to an individual that can change, based on various discourses and numerous social realities.

The reconstruction of the anchor point concept lies in melding in the power-relations at work among individuals, the discourses that occur on a daily basis, and the resultant effect of these power-relations and discourses. These power-relations involve the act of subjection. Recalling that subjection refers to particular, historically-located disciplinary processes, these processes enable us to consider ourselves as individuals and constrain us from thinking otherwise (McHoul & Grace, 2007). These disciplinary processes, which includes such practices as organizational rules, meta-rules, and social values, can be produced, and reproduced, in the privileged right to speak or in the practice of silence within a group. Subjection can also be reproduced within stories, myths and other discursive practices in everyday organizational occurrences.

The problematization of discourses and power-relations includes not only a consideration of women but women who are raced, of ethnic origin, of different sexual orientations, etc. It also includes men, who are as varied and as complex as women are. Men, in particular STEM-trained men, must be considered as an input to the intersecting identities of women. Discourses and meaning making are interrelated, and are no longer a construction based on contrast. To be clear, this interrelation is not in the sense of the Glenn relationality concept. Interrelation is used here in the sense of integrated, where men and women, among this web of power-relations feeding off each other, waxing and waning in their relationship.

To summarize, anchor points are intersecting identities that are discursively created and recreated. Anchor points are not just identity categories however; they encompass the act of their creation via discursive processes, the power-relations among individuals, and the critical sensemaking processes. They are not built based on ‘accusation and confession’ – as a relic of the concept of relationality - but are based on rules, meta-rules and social values reproduced in discursive processes and power-relations. An anchor point secures meaning, for a brief period of time, so that someone studying these meanings may consider the order that is (re)created. These anchor points then assist in building knowledge of how we order ourselves in a social reality (McCall, 2005; Staunaes, 2003). Anchor points exist as both an input to an individual’s self-identity and social-identity, and as an output of the power-relations among individuals. This concept is reflected in Figure 6.

Figure 6: Range of Anchor Points for an Individual

Chapter Conclusion

Section one of this chapter presented the literature review highlighting what we know about identity and intersectionality. Identity was positioned in the sociological perspective, moving away from the stable identity constructions. Self-identity was defined as the self-perception of ‘who I am’ while social-identity was presented as consisting of ideological, experience, and attachment ‘inputs’ into this self-identity. Identity work, or the meaning-making we enact, functions at the nexus of self-identity, social-identity, and anchor points. The intersectionality literature was reviewed, with a focus on power-relations and knowledge creation as co-existing together, for the particular case of Black women’s experiences. The body of knowledge within the intersectionality generalized theory of identity was then presented. Intersectionality, via this theory of identity, was defined as a multiplicity of non-additive, self- and social-identity categorizations that are interdependent and that constitute each other. The limited

work done to date on Glenn's (2004) anchor point concept and her interpretation of the relationality concept was also presented. The aspect of what is missing with the intersectionality literature was also considered within the confines of the anchor point concept.

The second section of this chapter focused on the presentation of the next branch of the research framework, forms of knowledge. The self- and social-identity concepts were clearly specified, followed by intersectionality. This theoretical framing moves us towards a consideration of the multiple and shifting self- and social-identity dimensions as a function of a study of discourses and power-relations. The reworked anchor point concept was then presented teasing out the hidden assumptions in the original Glenn anchor point. This teasing was premised on the need to add to the partial 'truth' with respect to intersecting identities. The key concern with the reworked anchor point concept is not to define a difference between men and women, or between any other identities; the focus lies on the power-relations among individuals and the resultant power effect. With this reconstruction, I can then focus on problematizing the power-relations and discourses that have (re)created the various and intersecting anchor points of the STEM-professional women and not just looking to problematize the White man as a dominant category.

Chapter 4: Forms of Experience

The complete research framework, presented in Figure 1, was built in such a way to be able to study the relationship among forms of knowledge (range of anchor points), forms of context (rules, meta-rules, and formative contexts), and forms of experience (discourses, critical sensemaking, and exclusion). While these forms work together in an interrelated fashion, I continue to present them branch by branch for ease of understanding. As I have done for each branch, the branch on forms of experience is preceded by a consideration of the literature, and what we know so far. In this way, I can demonstrate the flow of knowledge from the literature to date to this research framework.

Having said this, I need to bring these three moving parts together in this chapter as a way to provide a view from above. Imagine for a moment that you are standing at the top of a ladder, looking down at three puzzles laid out on a table. The puzzles may appear to not fit together, but then you start to ‘see’ that certain themes cross over all the puzzles, where one ribbon here and there joins all three puzzles. The three puzzles in this metaphor represent the three forms: context, knowledge, and experiences. When these three forms are looked at side by side, with the ribbon of anchor points running across these three forms, the experiences of exclusion begin to take shape.

I begin this chapter with a literature review on discourses, and on Weickian sensemaking. I then move to the literature on experiences of exclusion. I close the chapter with a presentation of the final branch of the research framework, forms of experience, weaving in the ribbon of anchor points in such a way to join the three branches together.

Literature Review of Discourses, Weickian Sensemaking, and Exclusion

I need to make an important distinction between processes and systems before presenting the literature review focused on these three experiences. Although processes and system can work in an interactive fashion (Dhamoon, 2011), it is important to understand that they are not entirely the same notions. Processes are comprised of practices that produce subjectivities and differences. They can be represented, for example, as discourses in the workplace that cisgender women, propelling them to follow a feminine ideal such as being submissive, nurturers, etc. Systems, on the other hand, can maintain and perpetuate discrimination/oppression/exclusion even though, in some cases, they may have been put in place to address these very acts of exclusion. Colonialism or Canadian employment equity legislations could be considered as examples of a system. I am going through this high-level exercise of differentiating processes and systems because discourses and sensemaking are commonly recognized as processes, and I will continue to treat them as such in this study. Exclusion, and the similar concepts of discrimination and oppression, can be either a process, or a system, or both. As such, I will present exclusion in the literature view as embracing both a system and as a series of processes.

Discourse.

Discourses, and discursive practices, offer a way to bring an object into being, as previously presented. They also offer a way of structuring the social world, into a useable and manageable pattern, whereby we make sense of events in that social world. This social world includes, clearly, the work or the occupational social world. As Zanoni and Janssens (2015) showed, discourses can position individuals in the work world in what

they referred to as the “occupationally defined self” (p. 1464). This occupationally defined self was revealed by an application of Fairclough’s (2001) understanding of texts and its analysis, and the study of “how discourses exerts power” (Zanoni & Janssens, 2015, p. 1466). Discourse, as I treat it in this study, is less in line with this linguistic analysis put forward by Fairclough, and is more inclined towards the Foucauldian macro construction of discourses and discursive practices as I presented in Chapter Three. This Foucauldian treatment of discourse does not negate the importance of social interactions; they walk together hand-in-hand.

Narratives, stories, myths and sagas are examples of discursive practices whereby we receive, organize, rationalize, and understand the social. These practices all have the ability to have their plot lines interpreted differently. They can also highlight “appropriate identities” (Townley, 1993, p. 537) that can offer comfort to individuals seeking to manage the onslaught of information to their nervous system (Saleebey, 1994).

MacIntyre (1984) said it best: “man [*sic*] is in his actions and practice, as well as in his fictions, essentially a story-telling animal” (p. 216). The discursive ‘truths’ within stories, narratives, myths, and sagas become “real and meaningful, fulfilling a need for people who find abstraction painful and who need metaphor to describe these concepts which inhabit our minds in an otherwise inexpressible fashion” (Runte, 2000, p. 259).

Narratives, stories, myths and sagas also continue a moral tradition of education on virtues (MacIntyre, 1984), both organizational values and individual values, that can be enacted and reconstructed in daily activities. Bowles (1989), in particular, underscored the link between the organization and the creator of meaning via notions of myths and

storytelling. Finally, discursive practices can destabilize and fragment, providing different frames where individuals enact organizational realities (Humble, 2014).

Narratives, stories, myths, and sagas are not the same, in spite of these similarities. These various discursive practices impact meaning and ‘truth’ differently in the social. Specifically, narratives are widespread and are attentive to form and style, often relating to prototypical matters (Saleebey, 1994). In essence, “they instruct, chasten, and lend rhetorical weight to norms and conventions” (Saleebey, 1994, p. 354). They provide an account of what someone did and why as the barest of informed narratives (MacIntyre, 1984). Narratives inform the present, based on past accounts, and allow for problem solving in the future. Some examples of narratives include interpretations, arguments, and opinions which lack plot, characters and action (Gabriel, 1998). Transcripts from U.S. Congressional hearings and business meeting minutes are two specific examples of narratives. With respect to meetings and the narrative output of these meetings, Boden (1994) studied ‘the business of talk’ in organizations, showing how narrative is influenced by a social reality, such as meetings, and similarly how the organization is itself influenced by these narratives.

Stories are more loosely organized and more idiosyncratic than narratives. Stories typically focus on a single event with a goal of entertaining, inspiring, and educating (Gabriel, 1998). They may instruct on “how to survive or how to accept – even how to overcome – difficult situations” (Saleebey, 1994, p. 354). They can convey, in essence, basic organizational values and beliefs. The meanings of a story are “ostensibly true” (Martin, 2002, p. 73), generating and sustaining meanings (Gabriel, 1998). They are, by their very nature, pulling on past events and so introduce an element of memory and

nostalgia. Stories are a key element of both Weickian and critical sensemaking, permitting someone to "...supplement individual memories with institutional (ones)" (Boje, 1991, p. 6). Examples of stories in the literature stretch over many different areas and ideas. One story that stands out is Patricia Monture's (1986) autoethnographic tale of her 'Othering' experience at a conference.

Some stories may become myths, but not all. Myths are an epic method of conveying the big 'truths' about an organizational culture which remain stable through time (Saleebey, 1994). They convey "appropriate attitudes, values and behaviour" (Bowles, 1989, p. 411) and so become a vehicle for the generation of said values, policies, and plans (Berg, 1985). They can also be characterized as a form of organizational control, leading in some cases to resistance discourses or apathy (Gabriel, 1995). Just as stories have elements of the past and of the nostalgic, so too myths. Organizational myths can "create images of quest and trial, struggling, like the hero, for survival against life-destroying forces" (Bowles, 1989, p. 413). The myth of the Mercury 7 astronauts in Tom Wolf's (1979) book *The Right Stuff* is an example of this epic method.

Finally, sagas run over time in contrast to a story which may cover a short-lived sequence of events. Sagas "with its heroes and scapegoats, battles and victories" (Berg, 1985, p. 286) can give organizational members symbolic points of reference in time, and can offer a reinterpreted meaning of past events. These reinterpreted events offer such power effects that they can mobilize a culture long after the events occur (Berg, 1985). Autobiographies, such as Ruth Bates Harris' *Harlem Princess* (Bates Harris, 1991) is one example of a saga, with nostalgia and memories ever present.

Empirically, the study of discourses has been done in any number of ways, in any number of social realities. Jermier (1985) used a short story as a literary device to compare two radical descriptions of subjective alienation, reified consciousness, and reflective militancy to illustrate the effect of mythical forces in organizational settings. Boje's (1995) "Stories of the storytelling organization: A postmodern analysis of Disney as 'Tamara-land'" stands out as an important work, exposing stories of the 'darker side' of an organization in the business of storytelling. Gabriel's (1995) "The unmanaged organization: Stories, fantasies and subjectivity", with its heroes, heroic survivors, victims, and object of love, also stands out as an important contribution to understanding discourses and its role in organizations. Similarly, Gabriel's (1998) "Same old story or changing stories? Folkloric, modern and postmodern mutations" focuses on stories and how they express organizational realities and that stories transform experience among internal and external players. Holmes (2005) studied New Zealand organizational narratives and their role in the construction of an individual's identity. These identities span both the professional and the social aspects of the workplace. Humle's (2014) study on storytelling, as a web of practices, similarly untangles the shared understandings of being within an organization and the impact of the construction of the self as an ongoing process.

Within the STEM world, two empirical studies focused on discourses need to be mentioned. Tucker, Pawley, Riley, and Catalano (2008) considered how engineers frame stories about themselves, and the work that they do. The authors also, importantly, considered how these engineering stories changed when framed within a feminist perspective. Ko, Kachchaf, Ong and Hodari (2013) "Narratives of the double bind"

considered life stories (sagas) of women of colour in physics, astrophysics and astronomy. The authors specifically studied how cisgender and race impacted identity, career, and performance in STEM fields. Given the importance of narratives, stories, and sagas in social reality, I was surprised that there weren't more stories set within the STEM world and focused on STEM identities. Discourses offer a way to bring a social reality into being, and a way of structuring the social world. If we are to make sense of events in the STEM world, we need those stories, narratives, sagas, and myth to be shared.

Weickian and Critical Sensemaking.

Weick's concept of sensemaking "unfolds as a sequence in which people concerned with identity in the social reality of other actors engage [in] ongoing circumstances from which they extract cues and make plausible sense retrospectively, while enacting more or less order into those ongoing circumstances" (Weick et al., 2005, p. 409). We come to understand "how different meanings are assigned to the same event" (Helms Mills et al., 2010, p. 183) by considering sensemaking and its seven socio-psychological properties. Weick's (1995, 2001) approach to understanding sensemaking, and these seven properties, provides us with an avenue to surface the diverse processes that contribute to organizational outcomes (Helms Mills et al., 2010; Vibert, 2004). These seven properties are:

- (1) Identity Construction: the eternal question of 'who I am' reflects this first property. Weick (1995) defined identity construction as where "people learn about their identities by projecting them into an environment and observing the consequences" (p. 23). The construct of identity, which I consider to be a

- process of 'becoming' rather than a stable state of 'being', is subjected to important influences given the impact of prior experiences, social interactions, retrospective processes, and power-relations (Helms Mills, 2003). Weick et al. (2005) perhaps said it best: “who we are lies importantly in the hands of others, which means our categories for sensemaking lie in their hands” (p. 416).
- (2) Retrospective: we compare meanings garnered from the past to be able to make sense of and give meaning to present events. This type of comparison allows us to shape the present, at times “omitting information to bolster...self-esteem and feelings of control” (Helms Mills et al., 2010, p. 184).
 - (3) Extracted cues: given the retrospective nature of sensemaking, cues such as rules and meta-rules assist the sensemaker in extracting the relevant information in such a way to make sense of an event.
 - (4) Plausibility: pulling from the extracted cues, the sensemaker seeks plausibility and not necessarily accuracy in the information at hand. The implication is that things, that may be accurate, may be replaced by faulty decision making, introducing the possibility for inconsistencies to come into play. These inconsistencies can be found “across hierarchical levels within an organization, or among different stakeholder groups” (Helms Mills et al., 2010, p. 185).
 - (5) Enactment of the environment: this property involves “making sense of an experience within (an) environment” (Helms Mills et al., 2010, p. 185). It is, in essence, the ability of an individual to engage the external environment

(Weick, 1979) which ultimately constrains how an individual behaves (Vibert, 2004).

- (6) Social: the process of sensemaking is “contingent on our interactions with others” (Helms Mills et al., 2010, p. 185). There are important influences from discourses in this social property of sensemaking, where discourse can be used to “...name events and influence each other as they act” (Taylor & Robichaud, 2004, p. 397)
- (7) Ongoing: sensemaking never stops. We do extract certain events and cues in an attempt to make sense of an event, but the process of making sense is constantly evolving.

Weickian sensemaking and its seven properties are central considerations in the experiences of an individual within an organization. The empirical literature focused on sensemaking is again a broad field to consider. Weick’s (1995) analysis of the heart wrenching stories surrounding firefighters that would not/could not drop their tools as they were an integral part of these men’s identities led to important new avenues of discovery of meaning.

The focus in this study is not however on Weickian sensemaking, but on critical sensemaking as defined by Mills and Helms Mills (2004). Where Weickian sensemaking ‘starts’ out at a shock or crisis event, the heuristic of critical sensemaking does not need this shock event in order for us to be able to study an organization (Helms Mills et al., 2010). Critical sensemaking, an analytical method that embraces power-relations and context, “looks at actions and beliefs as driven by plausibility not accuracy” (Helms Mills et al., 2010, p. 189). Embracing Foucauldian discourses, empirical research focused on

using critical sensemaking dove into different directions. Thurlow's (2007) study of discourses at a community college found that individuals made sense of organizational change via many interconnected avenues, including the centrality of identity. Carroll, Mills and Helms Mills (2008) study of call centres, and their managers and employees, applied critical sensemaking to privilege plausible understanding of management relationships, power, and resistance. Hartt, Helms Mills and Mills' (2012) dual ANTi-History and CSM framework, applied to archival materials, found that history is socially constructed storytelling with respect to cisgender relations. Paludi and Helms Mills (2013) exploratory study into Latin American executive women found that navigating differences involved learning about the Other. Finally, Prasad's (2014) autoethnographic experience of Jerusalem framed within a CSM analysis "brought to the level of consciousness my latent acceptance of prejudices that were engendered by a set of ethnocentric discourses." (p. 528). All these studies embraced critical sensemaking and applied them to various fields of study that enriched our understanding of the social world.

The experience of exclusion: Systems and processes of domination.

(R)epression operated as a sentence to disappear, but also as an injunction to silence, an affirmation of nonexistence, and, by implication, an admission that there was nothing to say about such things, nothing to see, and nothing to know. (Foucault, 1984c, p. 293)

How has the concept of domination functioned in society? Foucault attempted to answer this question within various systems and processes, first through his early work such as domination of the mad in *Madness and Civilization* (Foucault, 2001), and then

later on via the repression of sexuality in the Victorian age (Foucault, 1984b, 1984c). He identified three types of social struggles for the subject: (1) against domination, which he bracketed as being made up of ethnic, social, and religious experiences; (2) against exploitation that separates an individual from what they have produced, economic or otherwise; and, (3) against subjection and submission, in the sense that the individual is tied to herself, and submits herself to others (Foucault, 1983). Globally, his concern was to reveal how power-relations with respect to domination operate in a society in such a way “to create a history of the different modes by which...human beings are made subjects” (Foucault, 1983, p. 208). He did this investigation via a study of three modes³⁰: scientific classification; dividing practices; and, subjectification (Rabinow, 1984).

With respect to scientific classification, Foucault was concerned with how those making an appeal to reason “...try to give themselves the status of sciences; for example, the objectivizing of the speaking subject in *grammaire générale*, philology, and linguistics” (Foucault, 1983, p. 208). Foucault demonstrated how such an appeal to reason creates a social struggle that is, in essence, structuring and objectivising “being alive” (Foucault, 1983, p. 208). The body, as treated in scientific classification, in other words, was ‘a thing’ (Rabinow, 1984) and so could be exploited. For example, in *The Order of Things* (1966), Foucault demonstrated “...how the discourses of life, labor and language were structured into disciplines” (Rabinow, 1984, p. 9) thus underscoring a social struggle in light of these structures.

³⁰ While I am presenting these three modes separately, the reader is cautioned to understand that the three modes are not necessarily mutually exclusive experiences of domination.

With respect to dividing practices, these were considered “modes of manipulation that combine the mediation of a science (or pseudo-science) and the practice of exclusion – usually in a spatial sense, but always in a social one” (Rabinow, 1984, p. 8). Foucault’s dividing practices include being governed by rules, prohibitions, and rituals (Foucault, 1969). The subject is then “...either divided inside himself or divided from others” (Foucault, 1983, p. 208) such as the mad, or a prisoner who was incarcerated. These practices “that categorize, distribute and manipulate” (Rabinow, 1984, p. 12) can bestow a social identity to this subject. This subject can be seen, and characterized, as the ‘victim’ of these practices, caught in a web of dominating processes and systems. Importantly, these ‘victims’ were characterized as marginal, and the ‘Other’, in much of the literature focused on racism or sexism.

Subjectification, as Foucault’s final mode of domination, was concerned with processes of domination that an individual initiates themselves with regard to the self (Rabinow, 1984). This notion of subjectification, which permits us to consider ourselves as individuals and constrain us from thinking otherwise, is put into evidence in his work on repression, and the privileged right to speak. Specifically, he explored the practice of silence with regard to sex and sexuality, and to a person’s active formation of self in the Victorian age (Foucault, 1984b, 1984c). The subject in this study of domination, Foucault found, has the privileged right to speak, and is ‘active’ in these social struggles. This state of being is in opposition to being characterized as the ‘victim’, as she was in Foucault’s dividing practices with respect to the mad. Foucault also focused on an individual’s self-creation within this study of repression, where the self has many inputs into her own bodies/souls/thoughts, and ultimately on her conduct. This self-creation necessarily

involved the presence of a third-party, as either an ‘authority figure’ or a ‘confessor’ (Rabinow, 1984). This subject then was formed into a ‘meaning-giving’ and ‘meaning-making’ self within this complex construction of the individual (Rabinow, 1984).

Interestingly, Foucault focused on the individual within the privileged class, namely, the 19th century French bourgeoisie, demonstrating that domination functions in all classes, elite and non-elite (Rabinow, 1984). The goal of such studies into the privileged and their domination was not to blame, or attack, an elite/privileged individual or an institution. It was about the study of power-relations as they apply to the everyday for a certain class of individuals, marking an individual to her identity. The individual is, in other words, made a subject by control, by dependence, and by being tied to her identity (Foucault, 1983).

Today, the social function that domination plays continues in different guises, building on different branches of social and scientific research. Various contemporary concepts are used to describe systems of domination such as racism, sexism, patriarchy, and colonialism. I consider each ‘ism’ briefly, focusing on what ‘it’ is and what the social struggles can look like within each mode of domination. Racism can be defined as involving “participation in systems of domination the rewards for which are distributed inequitably among groups constructed as racially different” (Levine-Rasky, 2011, p. 247). Social problems such as access to housing and social services are part of this racist system of domination (Crenshaw, 1989). Sexism is a system of domination whereby women struggle against domination based solely on their sex, historically subsuming all racial and/or ethnic origins within this woman identity. Similar social problems plague women as in racist systems of domination with the added burden of being characterized as ‘under’ men with regard to economic and political concerns. Patriarchy, from Connell

(1983), accounts for the cisgender labour stratification where elite men enact dominant social definitions and values of their worth within an organization contributing to cisgender differentiation in occupational roles and in attempts for equal opportunity (Chafetz, 1988; Freedman, 2013). The social problems here are slightly different than in sexism where the stratification occurs within the work force, limiting cisgender women for example to positions that are feminized (i.e. nursing, administrative assistants, etc.). Finally, colonialism can be defined as the domination of the West over the East, where the people of Asia are built as being inferior to those of the West (i.e. Europeans, North American) (Said, 1979). The social problems associated with colonialism involve, bluntly stated, the extermination and exploitation of Indigenous peoples. All these ‘isms’ describe a particular form of domination that contributes to our understanding of identity.

What I found interesting with these contemporary treatments of domination is threefold: (1) an universalized, essentialized identity status; (2) all are victims of domination; and, (3) the presence of the Western, White man. With respect to the first point, these contemporary groupings of domination refer to one isolated identity category – race, sex, cisgender. Similarly, these ‘isms’ refer to a social group: African American, woman, Oriental, Indigenous. These labels insinuate a universal, and essentialized, individual. This essentialized individual can be studied in such a grouping but, I believe, this type of study would be adhering to Foucault’s scientific classification, structuring and objectivising ‘being alive’. With respect to the second point, the social struggles faced by these individuals assume they can be exploited economically or otherwise. These individuals can be not only categorized, as I pointed out in the first point, but they can also be distributed and manipulated into being victims of their (identity) categories,

and of their economic state. Finally, with respect to the last point, all these ‘isms’ assume that the Western, White man is the dominator as a norm (Friedman, 1995). The Western, White man becomes a meta-rule in these contemporary treatments of domination, ignoring the possibility of deconstructing this universality. Before I consider this meta-rule in detail, I need to consider the notion of oppression and intersectionality within domination systems and practices.

Systems of domination are also referred to as ‘oppression’ and ‘interlocking oppression’ (Collins, 2000; Marks, 1999; Young, 2011). Collins’ (2000) work on the matrix of domination, in particular, touched on the concept of interlocking or crisscrossing experiences of oppression for the Black woman. The interlocking oppressions, in her work, were organized via four domains of power: hegemonic (e.g. discourses) and interpersonal relationships as processes; and, disciplinary (e.g. bureaucracy) and structural (e.g. law, economy) experiences as systems (Collins, 2000). Marks (1999) considered the experience of oppression for disabled individuals in particular as a relationship. She highlighted the importance of painful experiences of oppression that “...affect self-esteem, and shape thoughts and actions, even when the person has no conscious awareness of them.” (p. 615). Young (2011) defined oppression as a political discourse where individuals who are oppressed “...suffer some inhibition of their ability to develop and exercise their capacities and express their needs, thoughts, and feelings” (p. 975). Young went further, expanding oppression as a family of concepts divided into five categories: exploitation, marginalization, powerlessness, cultural imperialism, and violence. Here, hierarchies, market mechanisms and “normal processes of everyday life” (Young, 2011, p. 1005) were responsible for structural oppression while

the ‘powerless’ had no way of resisting. The ‘powerless’ were then victims of these (Foucauldian) dividing practices and, I might add, of scientific classifications.

The intersectionality knowledge acquired to date has seen some of its own dividing practices. Specifically, intersectionality’s systems and processes of domination can be referred to as marginalization or exclusion or suffering from multiple jeopardies. One branch of intersectionality knowledge adheres to the theory of marginalization established by Cohen (1999). The ‘non-privileged’ status, or “looking to the bottom” (Matsuda, 1987, p. 323), with respect to the African American woman’s position within society falls within this theory of marginalization. This theory of marginalization reflects Foucault’s dividing practices, with a characterization of the individual as the ‘victim’ who is powerless in the face of being non-privileged.

Still within intersectionality scholarship, the generalized theory of identity (Nash, 2008) addresses domination in a slightly different fashion than marginalization. Recalling again from Chapter Three, the generalized theory of identity is applicable to all women since this state of ‘womanhood’ is intersecting with other identities such as race, ethnicity, cisgender, etc. (Allison & Banerjee, 2014; Nash, 2008). The construction of a complex individual based on ‘womanhood’ intersecting with other identity categories necessitates a different concept than marginalization for a variety of reasons including that it can be applied to a multitude of complex individuals for the most part³¹. What is exclusion within this generalized theory? Exclusion was defined by Nash (2008) as centering on “the experiences of subjects whose voices have been ignored” (p.3). Yuval-

³¹ There is an interesting branch of theoretical and empirical research led by Ashcraft (2012) that focuses on the identity position of occupational branding, which operates outside of the dialectic of exclusion and of inclusion.

Davis (2006) built an interesting argument around social division, identity categories, and an individual's subjective experience of their daily life to define exclusion. She broke exclusion down to its very basic element, namely 'normalcy', where "determining what is 'normal' and what is not, who is entitled to certain resources and who is not" (Yuval-Davis, 2006, p. 199). Cisgender, race, ethnicity, class, age, able-bodiedness are all categories that are discursively created, and recreated, that can divide individuals among two groupings: 'us' and 'them'. We can talk about exclusion regardless of how many individuals are impacted by this experience, such as we see in the social divisions of cisgender and ethnicity versus experiences of exclusion within Indigenous populations. What is key to the arguments of 'us' and 'them' is that there are critical elements of cultural, political, and historical influences on social divisions that must be accounted for, and recognized. This accounting necessitates a recognition of power-relations in the creation and recreation of social divisions above and beyond a simple listing of identity categories, and how many individuals are, or may be, affected (Yuval-Davis, 2006). The functioning of domination within this generalized theory of identity therefore embraces all three of Foucault's modes; namely, scientific classification, dividing practices, and, subjectification.

There is a hidden assumption within the notion of exclusion, that I hinted at earlier when I considered the various 'isms' of domination, and which I return to now. The White man figures prominently as an 'accusation' within social/historical/cultural divisions. For example, within the intersectionality literature, Adib and Guerrier's (2003) study of narratives of women hotel workers, Ashcraft's (2007) study of airline pilots, Hoogte and Kingma's (2004) study of development organizations, Rogers and Kelly's

(2011) study on health research, to name just a small sample of empirical work, all placed the White man as the ‘accusation’ of what was wrong within these complex individuals lived experiences. The White man was, and is, held up as a system of domination, in its own right. So even within a complex recreation of an individual within intersectionality scholarship, we have the perpetuation of a binary ‘either/or’ representation of social division based on the White man as being ‘us’. As hooks (2013) remarked, much of feminist literature has had an ‘anti-male sentiment’ attached to awakening “the spirit of rebellion and resistance in progressive females and led them towards contemporary women’s liberation” (p. 13). This call to arms was a charge towards cisgender equality, between all women and White men, that many answered. However, not all answer this call. In particular, Aboriginal/First Nations scholars such as Monture (1995) and Jaimes and Helsey (1997) have pointed out that equality with men is not universally sought within their societies. The Aboriginal/First Nations cultural and historical matriarchal societies may have a role to play in this; however, this is not entirely ‘true’ or ‘fact’. The notion of equality is a Western one, and is not necessarily embraced by different world cultures.

What does this mean, though, to be equal? Equality within a business organization is defined as “every individual’s status as a human being who has ‘equal rights’ to leverage his or her own abilities, talents, etc., to the extent of their own ambition and within the confines of the law and societal mores” (Karsan, n.d., p. 1). Canadian legislation exists that goes to great lengths to identify that individuals have basic human rights under the law. The *Canadian Human Rights Act*, in particular, “prohibits discrimination based on a person’s race, national or ethnic origin, colour, religion, age, sex, sexual orientation,

marital status, family status, disability or conviction for which a pardon has been granted” (Canadian Human Rights Commission, 2010). The construct of equality attempts to put everyone on the same level playing field which eliminates differences. This construction then adheres to the Eriksonian identity concept where ‘sameness’ or ‘selfsameness’ of an individual with another (and its continuity) are of primordial importance. Social division is no longer possible since everyone is built as the ‘same’, based on the ideal Western, White man. This ‘selfsameness’, within the business organization, is reflected in such things as equality of opportunity policies. Specifically, these policies often focus on equal hiring outcomes such as meeting quotas or practicing targeted hiring. Similarly, these policies ensure that hiring, promotion and pay are done based on this Western, White man. Anyone who does not ‘fit’ this same ideal – say two individuals who do exactly the same job but one who does not have the ‘ideal’ Western, White man’s credentials of Engineer – would not be guaranteed pay and promotions as they do not adhere to this ‘selfsameness’. U.S.-based Affirmative Action legislation and the accompanying programs fall into this ‘selfsameness’ division. They are fundamentally unfair to candidates given that this individual may be chosen over an equally capable candidate just to meet quota systems required by U.S. law. These systems play on the belief of levelling the playing field; however, this type of legislation creates a state of inequality, the very thing that it is trying to do away with. On the surface, it appears that these legislative means are in place to help the individual; the problem lies in the attempt to build everyone as being ‘alike’. These individuals are assimilated into a normative performance of homogeneous effectiveness and efficiency, while trying to curtail their individuality.

Equity, on the other hand, focuses on “the notion of fairness and justice and empowerment” (Karsan, n.d., p. 1). When an individual is treated equitably, their inherent differences are celebrated and embraced in such a way that their potential is achieved and this to the fullest extent possible (Jayne & Dipboye, 2004). The starting point for equity then is quite different than that for equality. The Canadian *Employment Equity Act*, which governs federal organizations and their employees, identifies four specific groups – women, visible minorities, First Nation/Aboriginal peoples, and persons with disabilities – that should not be “denied employment opportunities or benefits for reasons unrelated to ability” (Department of Justice, 2014). In addition, this *Equity Act* exists “to correct the conditions of disadvantage in employment” for these four specific groups (Department of Justice, 2014). This legislation underscores the potential of moving away from ‘selfsameness’ towards embracing diversity. The question becomes not of treating everyone in the same exact way but that the fair treatment of employees “requires special measures and the accommodation³² of differences” (Department of Justice, 2014). In theory then equity strives for inclusion of diverse individuals. There remain, of course, problems with respect to the inclusion of four specific social divisions based on identity categories, and that it is only applicable to government organizations, to resolve.

³² The duty to accommodate, a legal requirement within the *Canadian Human Rights Act*, requires employers in consultation with employees to identify, change and/or eliminate rules, policies, practices and behaviours that have a discriminatory impact or that create barriers (Canadian Human Rights Commission, 2010). Accommodation is an extension of this duty in that it requires changing the rule or practice to incorporate alternative arrangements.

Summary of Literature Review of Forms of Experience

The literature review focused on discourses and Weickian and critical sensemaking highlighted that discourses offer not only a way to bring an event, an experience, a value, etc. into being but also provides a way of considering meaning. Narratives, stories, myths and sagas are a way to receive, organize, rationalize and understand social practices within an organization. The added notion of Weickian sensemaking and its seven properties, while briefly considered, puts into evidence how we can organize and rationalize social practices as shared in stories and narratives. This was followed by an introduction to the difference between Weickian sensemaking and critical sensemaking. Critical sensemaking permits me to have a focus on an individual's identity and Foucauldian discourses and power-relations while privileging plausible understandings of resistance.

The experience of exclusion was considered within the overarching systems and processes of domination. I moved from Foucault's system of domination comprised of three modes - dividing practices, scientific classification, and subjectification - to the treatments of racism, colonialism, sexism, and patriarchy. I also considered oppression and interlocking oppression, linking them back to two of Foucault's three domination modes. I then moved on to the intersectionality literature and its treatment of marginalization and exclusion. I found important parallels with one of Foucault's three modes with respect to marginalization. For exclusion, I found that all three domination modes were represented, adding complexity to the theorization of exclusion that is missing within marginalization. Notably, the theory of marginalization treats the African American woman as a 'victim' of dividing practices. Exclusion considers dividing

practices, scientific classification, and subjectification to showcase dominating processes and systems for a variety of individuals. Exclusion can include scientific classification, turning the body of a disabled individual, for example, into a ‘thing’, structuring relationships as a result. Similarly, exclusion can include subjectification, where power-relations of the everyday mark an individual. This individual can then be made a subject by control, dependence, and by being tied to her identity.

This section closed out with the important question of what equality is, framed within the hidden assumption that the White man is the ‘normal’ in a binary either/or argument. Equity, which celebrates differences, was presented as “a vision of mutuality (as) the ethos shaping our interaction” (hooks, 2013, p. 13). There are remaining issues surrounding equity legislation, notably that there are only four social divisions that are considered, but this system has the potential to move us away from treating everyone as the same.

Research Framework: Forms of Experience

The first and second branches of the research framework for this study are focused on helping me to identify the range of anchor points for STEM-professional women, and then to identify the relationship between selected anchor points from this range with the organizational rules and formative contexts. The final branch of the framework helps me to look at the relationship between selected anchor points and the discursive interrelated dominant ideas and practices. It also helps me to look at the relationship between anchor points and the critical sensemaking processes of individuals. In other words, this research framework’s third branch is where I will examine the relationship between anchor points with discourses and critical sensemaking. The three branches working together will also

provide me with an avenue to address the third and final research question, namely to identify how an individual's anchor points influence the exclusion of STEM-trained women from management/executive positions within the Canadian space industry. With these ideas in mind, I conclude the construction of the research framework for this study as I started: I base its constructions on the literature review presented in the first section of the chapter.

I am taking this opportunity to address and close out the construction of the individual given the centrality of anchor points in this study. I am melding in the final two puzzle pieces, as it were, of discourses and critical sensemaking into this construction. An individual is made up of their self- and social-identities, and their anchor points. This individual is in a state of being, and of becoming, that is self-regulating, influenced and limited by such systems and processes as rules and meta-rules, and formative contexts. She is also conforming and responding to discourses and power-relations of the every day. She responds to the creative needs of these mundane interactions via her critical sensemaking processes. Importantly, this individual, via discourses and her critical sensemaking processes, has the potential for resistance (Hutton, 1988). She is then conforming and resisting, self-creating and created by others, dominated and dominating into a meaning-giving and meaning-making self.

With respect to the three experiences specifically addressed in this chapter, discourses, critical sensemaking, and exclusion, they are linked to each other and do not necessarily flow linearly as experiences. I could easily start with the experience of exclusion to then tease apart the discourses and critical sensemaking processes of an individual in order to look at the relationship between anchor points and interrelated

dominant ideas/critical sensemaking. I am choosing to start at the experience of discourses, limited to stories and narratives, for two reasons: the first is focused on enjoyment; and, the second, is the centrality of political discourses.

The first reason is rather simple: I, like many other people, enjoy stories with their heroes/heroines, villains and victims, resistance and empowerment. Stories engage me, excite me, frustrate me, and can even make me mad. The emotions conveyed in shared stories draw you in, making you part of that story. They can compel you to do ‘something’, whatever that ‘something’ may be. Stories are also a mechanism that can reveal values and rules as they are interlaced into these stories, without the individual necessarily recognizing them as such. Similarly, as I found in the literature review, narratives can also inform the present, and allow for problem solving in the future. Boden’s (1994) characterization of narratives, as ‘the business of talk’ in organizations, influence the social reality, and can compel the reader to engage with the ‘business’ in question. Meeting narratives can also reflect an individual’s anchor points, as I showed in my act of reflexivity in Chapter One, such as Arm-Wrestling ‘One of the Guys’ in a contentious meeting.

The second reason I am starting at the experience of discourses has to do with the political nature of discourses and how, ultimately, they can transform the social world (Phillips & Hardy, 1997). Empirically, I found few papers that presented stories of STEM-professional women within a business organization; there were some papers focused on STEM-professional women in university faculty positions, one of which I presented in the previous section. I could find no stories of STEM-professional women in the Canadian space industry, and yet we are present in this industry, and we have a few

stories to share. The vast majority of the academic and practitioner literature I found was focused on how to integrate women, bringing them into the fold, to comply. Much to my frustration, networking, mentorship, and leadership building skills seem to be predominant in the literature. I want to hear about the women who have been and are silent. I want to hear their stories of triumphant and of resistance, of demoralization and of happiness, of heroism and of defeat. I believe that the stories that are more difficult to read and navigate should have a platform and should be shared in their own right. If other women want into this STEM world, I believe they need to hear the day-to-day dominant ideas. The painful, the playful, and the triumphant stories all need to be told. They also need space to influence and to transform the social world. Ultimately, if I did not promote the stories and narratives first, I believe, I would be practicing silence as a mode of subjectification, repressing further the STEM-professional woman.

With respect to the experience of critical sensemaking, many of us tend to embrace story-telling but there is more to just telling a good yarn. We can tell a single event with the goal of entertaining, inspiring and educating all the while the story itself can reveal rules and values. Also, we pull on who we are and who we want to be when we organize our thoughts to transmit them in that story. This centrality of identity, as Thurlow (2007) found in her application of critical sensemaking, can be teased out from the discourses to reveal the individual. The ongoing nature of critical sensemaking implies that the centrality of identity and of the power-relations (reflected in discourses) are not fixed or stable. They ebb and flow throughout our narratives and our stories. So, in other words, stories and narratives will be plausible in the moment they are told, and my interpretation of those stories will also be plausible in the moment that I interpret them. This

plausibility does not imply though that the stories and narratives and identities will not/cannot change in the future. They are, simply stated, a fragment of the past that can be examined in such a way to be able to make sense of, and to give meaning to, events/experiences/ideologies.

Within this study of the critical sensemaking experience, I must also look to shared discursive processes. I say 'must' since I know I am looking at the experience of exclusion. Specifically, exclusion has important influences from Foucault's subjectification, which melds in social interaction and the presence of a third-party. Foucault identified the third-party as an 'authority' or a 'confessor'. I could easily place myself as the 'confessor' in this study. However, I believe that I am not the only one involved, that there are others who are part of this social interaction. The key idea here is the notion of 'shared' in that discursive experiences that are shared invite me to look for cells of influence, where individuals interact together in the day-to-day. For example, a STEM-professional woman who works with a colleague, who happens to be a STEM-professional man, would be an example of a cell of influence. Their independent stories, in a specific work-related social reality, of an event or an experience can both complicate, and simplify, an understanding of this event. It can complicate it in the sense that they could share two very different perspectives, as a function of their critical sensemaking experiences, of an event that can lead to head-scratching confusion about what 'actually' happened. It can simplify in the sense that an event, such as the extensive and laborious hiring policies in certain Canadian space organizations, can become clearer and easier to understand from two perspectives. Our interactions with others, where various influences dot our discourses and our identities, also play an important role. For example, in my act

of reflexivity I shared a story that I was told by the chair of a meeting that it was great to have a woman at the table to act as the nurturing and caring voice. I did my best to assume this temporary (cisgender) anchor point for any number of reasons (i.e. to make him happy, to make me happy, to embrace being a woman as I had been given permission to do so, etc.).

The experience of exclusion is linked to discourses and critical sensemaking processes. I've talked to the complexity of recreating an individual based on their self- and social-identities, and their anchor points that are discursively shared, and are a result of critical sensemaking processes. I've also talked to the STEM-professional woman and her cell of influence, and her critical sensemaking of the discourses in her cell. The act of ordering a social reality is also contingent on these social interactions and discourses. The discursive acts of ordering can constrain the sensemaker "to seek out familiar solutions that have worked in the past...and [that] maintain the social status quo" (Helms Mills & Mills, 2009, p. 175). The theoretical framework is focused on exposing the social status quo via a study of the interaction of three experiences: discourses, critical sensemaking, and exclusion.

Finally, the experience of exclusion is challenging to consider since I am moving away from binary either/or relationships. The prominence of the White man as an 'accusation' is not my focus in this study, and so the research framework must reflect this. I am not interested in "any preconceived reduction of knowledge" (Rabinow, 1984, p. 4) to the social conditions of being a White man. I am interested, as Foucault was, in the discovery of social practices as reflected in the discourses of the day-to-day. I am interested in the individual as an 'active' participant in their self-creation, and in the

many inputs into this individual's own body/souls/thoughts. These inputs include the important third-party, as it did for Foucault, but not as a blind characterization of the privileged White man at the top. The framework, to be clear, also does not include a search for equality with Western, White men. I take inspiration from historical, cultural and political studies that did not universally seek out equality within specific societies. The study of the experience of exclusion is then fundamentally about power-relations as they are enacted in the everyday, and the effects of power as they mark an individual and her identities.

Chapter Conclusion

The forms of experience complete the research framework, forms of context and forms of knowledge. The three branches work together to help reveal the limits and boundaries of 'who I am' and 'who I am becoming' with respect to the STEM-professional woman. I constructed, via these three forms working together, an individual who is in a state of being and of becoming via her discourses and power-relations that she was subject to and a participant in. Her anchor points, along with her self- and social-identities, capture and reflect the discourses of the everyday, mundane interactions. These anchor points also reflect her critical sensemaking of these day-to-day interactions. The social discursive reproduction and critical sensemaking of intersecting identities can establish, maintain and proliferate limits and boundaries that result in her movement to the periphery. This complex individual, represented via her self- and social-identities and her anchor points, becomes the Other within an ordered social reality. This 'movement to the periphery', an act of ordering, I call the experience of exclusion. This exclusion is not a stable experience as it involves discourses of both productive and oppressive

power-relations, on various interactions, among individuals and the critical sensemaking of discourses, and these interactions.

Chapter 5: Research Methodology

The methodological organizing principles are the focus of this Chapter, building on the literature reviews and the research framework presented throughout the previous chapters. My goal in this chapter is to provide insight into the structure I used for conducting this research. The organizing principles are broken down into: presenting concisely the research questions for this research; addressing the chain of evidence; presenting my data analysis strategy, by briefly summarizing the CSM heuristic, and providing tangible examples of how to apply this strategy to collected data; and, finally, addressing how, and why, I chose to represent the complex individuals as I did.

Research Questions

This section concisely presents the research questions that guided this study. The research timeline, to answer these questions, was captured in the electronic ethics application. The ethics approval for this research is reproduced in Appendix A.

(RQ1) What is the range of anchor points associated with and available to STEM-professional woman within the Canadian space industry?

(RQ2) What is the relationship between selected anchor points and structural (e.g., organizational rules, formative contexts), discursive (interrelated dominant ideas and practices), and socio-psychological (e.g., critical sensemaking) processes?

(RQ3) How do these anchor points influence the exclusion of STEM-professional women from management/executive positions within this industry?

Chain of Evidence: Second “I” in Intersectionality

The Canadian space industry is made up of a wide-range of individuals. This social reality has the potential then for a large web of discourses to study. To narrow the focus to a manageable number of stories and narratives, the research questions guided me in identifying the protagonist for this research. Notably, recalling that the research questions all have a common component of anchor points, I had to identify and choose a primary identity category first since I am following McCall’s (2005) intercategory approach to intersectionality as I presented in Chapter Three. I began with ‘woman’ as this primary identity. I then followed this narrow identity category focus by recognizing intersection(s) of the shifting state of ‘womanhood’ with other possible identity categories. This layering is done in a non-additive fashion where identities constitute each other and are interdependent. Participants were initially identified via this state of ‘womanhood’, where I embraced both cisgender women and transgender individuals who self-identified as women. The identity categories of race, ethnicity, sexual orientation, STEM-trained, etc., were then left up to the individual to identify in the recruitment script, found in Appendix C. These potential participants also had to occupy employee or manager positions within the Canadian space industry to be considered for this study. This approach then, specifically excluded students or part-time/contractual (i.e. determinate) STEM-professional women. I made the decision to exclude these individuals as I believe the power-relations involved in these temporary occupational positions would hinder my attempts to focus on certain discursive and critical sensemaking experiences.

I also recognized, while building this study's protagonists, that I necessarily had to have the participation of cisgender men and transgender individuals who identify as men in this study. Recalling that intersectional feminism specifically considers the political nature of the lived, interdependent, constituting experiences of women (McKibbin et al., 2015), their lived reality in relationship to others – STEM-professional men – could assist me to create knowledge based on discourses and power-relations within systems and processes of an industry. In other words, I would not be studying STEM-professional women in isolation; I would be studying them within the complex, political social-reality that is made up of a variety of individuals. The cisgender men and transgender men's discourses could then potentially be used to triangulate the stories and the narratives into a cell of influence, as I presented in Chapter Four. To be clear, the goal was not to reveal the possible range of anchor points for men. It was to ensure a richness of data reflecting the complexity of this social reality.

The recruitment of a total of twelve participants was done via a snowball referral technique. This technique was chosen to avoid the introduction of my own inherent biases given my extensive network of personal contacts. I also chose this recruitment method given my position of privilege in this industry, as the only Canadian woman Mission Manager working as a public servant. Note that I specifically excluded individuals from my work unit because of this privileged position. To ensure anonymity of the participants in this study, I used pseudonyms and hid certain details such as ethnic identity and specific STEM degrees earned. The participant recruitment protocol, script, instrument, informed consent letter, and the participant consent form are included in Appendix B, C and D, respectively.

In theory, recruitment should cease once no new substantial themes and insights emerge (Kvale, 1996). However, my particular journey in recruiting and interviewing individuals for this study involved unexpected, and unplanned, events. I found, as I began to delve into the discourses of the study participants, that I began to remember my own painful exclusion experiences in this industry. I also found that I could no longer be party to the hidden existence I had embraced for so long. I gave media interviews, denouncing the status quo within this industry, stating plainly that “it’s unacceptable” that I was the only Canadian woman Mission Manager in 2016. While I was mirroring Prime Minister Trudeau’s words, this would mark my ‘coming out’. The accompanying painful discussions with one particular woman stand out for me as a watershed moment in my research. She tried to persuade me to remove those words from interview transcripts as she found that they were too inflammatory and too ‘negative’ to the brand of the organization I worked for. Her persuasion, to be clear, was more in the lines of a threat to my employment and to my research. This is not the place, however, to go into the details of this experience; I was urged by many in my academic circle to capture this experience of trying to conduct *good* research in a separate paper, which I have done (Ruel, submitted). What is relevant here is that there was an impact on recruitment as a function of my ‘coming out’. I had to significantly speed up the recruitment of participants and conducting their interviews before the articles came out in the popular press. In an attempt to maintain the snowball referral technique, I asked my husband, who also works in the industry, to make a list of individuals he knew who fit my recruitment criteria. I then contacted those individuals who for the most part agreed to participate. I conducted the unstructured interviews off-site, to ensure I maintained the participants’ anonymity

and to ensure that they were able to speak to me openly without fear of discovery. Due to the snowball sampling technique used, and due to this rush to recruit and interview participants, the sample of twelve was not as diverse as I had initially planned. Notably, no transgender individuals were part of this study. I personally know two individuals who self-identify as transgender; however, since I did not receive a recommendation to include either of these individuals I could not include them. Similarly, only one individual with an ethnic identity was recommended to me and is part of this study. Another individual who self-identifies as being within an ethnic identity, whom will remain unnamed, was also referred to me. However, this individual was ultimately unable to participate due to an impending baby's arrival.

Two participants from the initial sample of twelve requested to be withdrawn from the study. Whether they withdrew because they read the interviews I gave, or for other personal reasons, is not clear to me. Given the recruitment protocol I chose, and the informed consent form that participants signed, I could not ask them why they wanted to withdraw from the study. The overall sample, now totalling six women and four men, is diverse from the perspective of STEM-education level (that is, bachelors, masters, PhD), professional and occupational roles (that is, executives, managers, engineers, scientists), career stage (that is, early career (under 5 years), mid-career (over 5 years but under 15 years), late career (over 15 years)), and public (two) and private (three) Canadian space organisations. These ten participants and some of their identities are listed, in no particular order, in Table 3.

Table 3: Participants

Name	Cisgender/Ethnicity/ Cultural/Sexual Preference	Profession/ Career Stage	Marital Status/ Family Status
Geirit	Woman/White/ Anglophone/ Sexual orientation not defined	Lead/ Senior Engineer/ Early-Career/PhD	Single
Eliya	Woman/White/ French (European*)/ Heterosexual	Employee/ Junior Engineer/ Early-Career /Master STEM*	Single
Bramun	Man/White/ Bilingual*/ Canadian Heterosexual	Employee/ Junior Engineer/ Late-Career/BEng	Single
Desrit	Woman/White/ French (Quebec)/Canadian/ Heterosexual	Manager/ Senior Engineer/ Late-Career/ BEng	Married, two children, one special needs
Arwyn	Woman/White/ French (Quebec)/Canadian/ Heterosexual	Employee/ Junior Engineer/ Mid-Career/MEng	Married, three children, one special needs
Jorodr	Man/White/ French (Quebec)/Canadian/ Heterosexual	Manager/ Senior Engineer/ Mid-Career/BEng	Married, one child
Stynir	Man/White/ French (Quebec)/Canadian/ Heterosexual	Employee/ Junior Engineer/ Mid-Career/BEng	Married, two children, one special needs
Vigrine	Woman/White/ French*/Canadian/ Heterosexual	Employee/ Unspecified*/ Late-Career/MSc	Married, three grown children, grandmother
Ormyr	Man/Ethnic Identity* /Bilingual* /Dual Citizen/ Homosexual	Executive /STEM*/ Mid-Career/PhD	Married, two children
Inenya	Woman/White/ Anglophone/American/ Sexual orientation not defined	Employee/ Junior Engineer/ Late-Career/BEng	Single, two children

* To protect participants, I must hide her/his specific cultural, academic identities.

Collected data included participants' narratives and stories as they shared them with me during the unstructured interviews. Narrative data was tape recorded during the unstructured interviews. This avenue of unstructured interviews was specifically chosen given the quantitative and qualitative findings that show that identities categories are best left to the participants to identify in their own voice (Ashmore et al., 2004). The tape-recorded interviews were maintained in three separate physical locations, with appropriate separate password protection for each location. A variety of documents including participant e-mails and corporate publicly available reports also made up this collected data. The documents were similarly saved to three different physical locations.

A copy of the recorded interviews was provided to two professional transcribers. They either transcribed, when participants chose to speak in English, by one professional transcriber or were translated and transcribed from French to English by the other professional transcriber. This French-English live translation/transcription was a viable financial option, given the experience of these professionals and my own bilingual cultural experience in this industry. Working together, we were able to produce a sound transcription of these recorded interviews. The option to conduct the interviews in French or in English reflects the linguistic reality of the Canadian space industry, where a job requirement can require individuals to speak both official Canadian languages. This bilingual option also reflects Pavlenko's (2001) call for the inclusion of bilingualism in research. The resulting transcriptions were kept in three different physical locations, and were password protected, to ensure a traceable chain of evidence.

Data Analysis Strategy: CSM

The methodology must necessarily support the ontological and epistemological perspectives I have built in the previous chapters. This assumption implies that in order to be able to study the power-relations that flow through the social, I must examine them via an analysis strategy that assists me and does not hinder or hide them from view. The analysis strategy must also recognize and support the idea that I am not striving to establish causal links about why something has happened (Yin, 2009). What I mean by this is that socially-constructed discourses, and the study of these discourses, relies on the idea of enabling the self-disciplinary individual (Bryman & Bell, 2011). Enabling and causing are two mutually exclusive notions, and so the analysis work must reflect that I am looking at enabling relationships and not cause-and-effect. Also, as a poststructuralist, I am concerned with bringing to light an event or an experience not as ‘truth’ or ‘fact’ but as a plausible window into a social reality that has up until now can be best characterized as a wall. I refer to this plausible window as ‘revealing’. The act of revealing is not to seek out and believe in one ‘truth’; it is about having a look inside at a particular moment in time and in space to ‘see’ what is happening.

The CSM heuristic (Helms Mills et al., 2010) assists me in this work focussed on both the power-relations and the consequences of those power effects. CSM, as introduced previously in Chapter One and as discussed at length in Chapters Two, Three, and Four, is comprised of four heuristics interacting together. The framework is shaped from Weick’s (1995) sensemaking, Foucault’s (1978, 1980) discourses, Mills and Murgatroyd’s (1991) organisational rules, and Unger’s (1987a, 1987b) formative contexts. CSM went in a different direction from Weickian sensemaking where these

heuristics working together create the analysis framework for how people come to understand ‘things’, ‘objects’, etc. Interaction, as I have explicitly stated previously, is the key consideration in using CSM as an analysis strategy. In other words, there is no structural or procedural step-function among critical sensemaking, discourses, rules and meta-rules, and formative contexts.

The beauty of the CSM framework is its focus on discourses. Social realities cannot be understood without investigating discourses that are practiced and that influence other discourses in that reality (Phillips & Hardy, 2002). Discourses centred on an individual’s identities reflect power-relations that flow through the social. They also give meaning to social life. Specifically, these identity discursive acts working in tandem with critical sensemaking constrain the individual “to seek out familiar solutions that have worked in the past...and [that] maintain the social status quo” (Helms Mills & Mills, 2009, p. 175). These familiar solutions are influenced, in part, by institutional rules and meta-rules, and formative contexts. Recall that rules and meta-rules function as a pre-existing framework determining how ‘things get done’ (Mills & Murgatroyd, 1991). Formative contexts capture and reflect dominant social assumptions (Unger, 1987b). Individuals can discursively express and practice institutionally dominant social values, rules and meta-rules without necessarily realizing that this relationship between discourses and social structures exists. CSM therefore provides a framework to study discourses, weaving in an individual’s critical sensemaking, institutional rules and meta-rules, and formative contexts all together. CSM ultimately assists me to reveal “the consequences of those power effects for individuals” (Helms Mills et al., 2010, p. 189).

The analysis strategy is once again broken out into the three forms I presented in Figure 1: forms of knowledge, forms of context, and forms of experience. Note that I chose explicitly to begin with forms of knowledge in this chapter, as opposed to forms of context, because of the centrality of anchor points in the organizing principles presented previously.

Forms of knowledge: Range of anchor points.

I focused, within the forms of knowledge analysis, on the narratives and stories that people use to construct their industry, their occupation, their job, and their self (Boje, 1991, 2001, 2008). I also searched for and extracted what others would say of and to an individual concerning ‘who I am’ or ‘who I am becoming’. These various discursive aspects necessarily required input(s) from not only the individual being interviewed but also the STEM-professional men who are part of the STEM-professional woman’s community or cell of influence. I say ‘necessarily’ since I believe I needed to achieve a sort of triangulation of stories to ensure some cohesion in the stories and events. This notion of triangulation has roots in Yin’s (2009) use of multiple sources of evidence. The advantage of working in this way is introducing a broader view of the day-to-day issues involved in a particular social reality. I am not necessarily looking for corroboration, as Yin (2009) suggests, in this triangulation, I am looking for added richness to the stories and narratives within the STEM-rich Canadian space industry. Similarly, the written corporate documents, and written emails from participants, are an integral part this triangulation activity.

This triangulation also raised important challenges within the interview process itself. Specifically given that I had chosen unstructured interviews, I had to let the conversation

go where it needed to go from the participants' perspectives. I also could not reveal to any individual who was participating in the study; so, I could not say for instance "X told me that Y happened. Did you see/hear what happened? Do you think X was correct in her/his assessment of Y event?" Similarly, as I used snowball sampling, there was no guarantee that I would receive referrals that would match into one cell of influence. For example, Arwyn's cell of influence was made up of Arwyn herself, of a male colleague in her unit, and of their male supervisor. Inenya, in contrast, had no cell of influence within this study. In her case, I found that her discourses around her range of anchor points incorporated views/stories from others so much so that I decided that I could keep her within the sample.

To reconstruct an individual from data, I looked for discourses that shared self- and social-identities as well as her range of anchor points. The STEM-professional woman is given ontological being via these socially-constructed, discursive (re)creations of her identity. I achieved this (re)construction by first searching through the discourses for statements such as "I am...", highlighting those until I exhausted the interview transcript. I then passed a second time through the transcript, searching for and highlighting statements regarding the STEM training and education achieved, as one example of social-identity discourses, and other social-identities that I considered inputs into her self-identity. I then passed through the transcript a third time, searching for stories specifically attributing anchor points. These stories would sometimes start with "I was at a meeting..." or "I was told that..." or "Did you hear about...". Finally, I passed through the transcript one final time, looking at the (yellow) highlighted identities in relationship to the other forms, notably context and experience. At times, the forms of context would

guide me to the realization that I had attributed say a self-identity to an anchor point and I would correct my analysis.

To highlight the analysis strategies surrounding anchor points, I share one particular early career participant's experiences. I found that Eliya's attributed 'the only girl here' anchor point was reproduced in a number of her discourses:

In W there were classes where I was the only girl.

At Y project, all my meetings are nearly all boys, by phone, or in person. Y doesn't have many girls...

[Specific supervisor] ended up with some girls [laughs]!

The demographic reality of this industry, as I presented in Chapter Two, supports this state of being. Specifically, there were, and continue to be, very few STEM-professional women who work in this industry. In addition, this anchor point was reproduced in almost all of the participants' discourses. The narrative surrounding this anchor point, specifically the presence of 'girl' in Eliya's and the other participant's discourse, is also important to recognize in this analysis. Cisgender and diversity scholars go to great lengths to identify that a 'woman' is a cultural representation of an individual. However, Eliya and most of the other participants in this study used 'female' or 'girl' interchangeably and easily while 'woman' almost never appeared in their discursive processes. Notably, Eliya's supervisor, a STEM-professional man, was discursively presented as the head of a harem of 'girls'.

The (re)creation of this individual led me to not only the possible range of anchor points, but also how these discourses surrounding these anchor points came into being.

This aspect of discourses coming into being was an integral part of the analysis work. The STEM-professional woman's coming into being was reconstructed then from two discursive elements that she shared: her self-perception; and, her social construction from others. I also looked at both the STEM-professional woman's discourses and the cell of influences together. This part of the analysis required a more organic analysis, where ideas would form from my own acts of reflexivity to 'see' the window of 'truths' unfold before me. For example, I would highlight in the transcripts a particular story passage – that would move me, captivate me, frustrate me, or make me question what the participant was trying to say – and then I would move to that individual's cell of influence transcripts to see if there were any parallels in that story telling – was that meeting contentious? did that person retell the story with a completely different lens? Then I would bring these ideas together with what I 'knew' of the individual as she had told me in her stories and narratives to retrace the discourses coming into being. For example, Eliya had been attributed an 'Elite' anchor point. I found that within her cell of influence, one individual demonstrated indifference to being in the 'prestigious' space industry. When I returned to Eliya's discourses revolving around her education, I 'saw' her critical sensemaking and discursive influences surrounding what she presented as being the 'elitist' European education system. I also 'saw' her critical sensemaking and discourses surrounding the job interview processes in the space industry as 'prestigious'. I concluded in my analysis that there were important influences from: (1) her retrospective sensemaking of education values and rules; and, (2) what she interpreted as the rules and values of the space industry.

Forms of context: Organization meta-rules and rules, and formative contexts.

As I discussed in Chapter Two, meta-rules are defined as system-wide rules such as legislation or policies. These meta-rules along with organizational rules, which are social constructions, determine how ‘things get done’. Similarly, formative contexts are defined as bringing together dominant social values with individual action (Helms Mills et al., 2010). These forms of context – meta-rules, rules, and values - are an avenue for analysis where sense is made (Hartt et al., 2012).

Forms of context can assist me in creating a window into the power-relations that are at play, but how do I apply these forms to data collected in such a way to achieve the research objective? The empirical academic literature provided some guidance on how to apply rules and meta-rules, and formative contexts in analysis. I began the analysis by considering the discourses that were produced in, and around, the (re)creation of an individual’s anchor points. I then focused on rules, meta-rules, and social values as the participant expressed them around various experiences and events. I did this in order to reveal “the consequences of those power effects for individuals” (Helms Mills et al., 2010, p. 189).

For example, within Eliya’s discourses, I found the attribution of the ‘Elite’ anchor point to this early career participant. As she told her story, certain men in her entourage had attributed this identity to her. Eliya also shared a number of other stories centered on navigating getting a job in the space industry, where rules and social values that embrace this elitism were prevalent to her. Specifically, by focusing on Eliya’s stories surrounding her international education, I found that the European education system (as a meta-rule)

had an important rule and social value dimension, that supported this ‘Elitism’ peppering her discourses:

Very elite...It’s a bit like CEGEP³³ preparatory, specialised in math and physics, and at the end there’s a competition and depending on the results, the best go to the best schools, and the ones who didn’t perform as well go to schools that aren’t quite as prestigious.

There’s a stream you can take when you are good in math and physics, very elite, so I applied to that but it didn’t work out. I guess I hadn’t really understood the point of those schools; everyone wanted to go to a very prestigious school...

I ended up with three ulcers, that was horrible...I worked really hard to be part of the double-diploma. I had to be top five of 160. I really worked hard.

In analysing these discourses, I interpreted this prestigious rule and social value as an important influence on Eliya’s retention and critical sensemaking of the attributed ‘Elite’ anchor point. In other words, she held on to these discourses, such as ‘being the best’ or ‘we don’t hire just anyone’, creating a relationship between her educational and her professional STEM experiences. Working hard to the point of making herself physically ill, was part of this ‘elitism’ she believed; it was a value that was drilled into her, via her education, and which she continued to apply in her day-to-day STEM-profession. I interpreted these discourses as revealing ‘how things get done’ in this particular STEM field. This interpretation is supported by the empirical literature presented previously, in Chapter Two, on the macro and meso space industry. Finally, the rules and social values that Eliya retained, and applied, to her everyday life within the space industry reflects an

³³ CEGEP, or *Collège d’enseignement général et professionnel*, is a Quebec college preparatory system for general and vocational studies.

important interaction among her discourses, power-relations, and her sense of self as representative of identities. That there is a relationship between her anchor point, as an elite, and the forms of context, embedded in prestigious education sectors, in this specific example can then be mapped to reflect these relationship interactions.

So why is this important? As Carrol et al. (2008) point out, these rules, meta-rules and formative contexts not only assist an organization's members to coordinate their activities, they also help to define "role structure, expectations, and behaviors that ultimately contributes to identity construction" (p. 63). By shining a light on these relationships between anchor points and forms of context, I can continue to build an understanding of not only who Eliya is (identity) but also illuminate the vehicle of control that is used within space organizations.

Forms of experience: Discourses, critical sensemaking and exclusion.

Discourses, as I treat them in this study, go beyond language, texts, or simple measurement. They encompass "everyday attitudes and behaviour [*sic*], along with our perceptions of what we believe to be reality" (Grant et al., 1998, p. 2). Stories and narratives, as two vehicles of discourses that I specifically chose to focus on, provide an individual a way to receive, organize, rationalize, make sense of, and understand social practices (Boje, 1989; Foucault, 1978). Stories and narratives can also perpetuate a moral/ethics tradition of education with respect to virtues and values (MacIntyre, 1984) thereby hijacking meaning and hence, critical sensemaking within an organization. Finally, everyone can express dominant social values through organizational narratives and stories.

With respect to exclusion, Foucauldian subjectification is concerned with domination that an individual initiates themselves with regard to the self (Rabinow, 1984). I constructed this self as an individual who is both in a state of being and of becoming, that is self-regulating, influenced and limited by formative contexts and rules. She is reshaped and recreated to conform to creative needs (Hutton, 1988, p. 137) while also, importantly, having the potential for resistance. In other words, the individual has a role to play in her ordering within a specific social reality. She is not at 'fault' or to be 'blamed' for this state of being as the goal of studying exclusion is not to define cause-and-effect situations. The goal is to study the 'how' of this ordering, the complex interplay of relationships in this ordering. This plausible 'how' of domination changes the conversation, from one focused on defining binary 'either/or' relationships to one of complex relationships, with the individual present as critical sensemaking, and sense-giving, entity.

The individual requires a closer look to address the experience of exclusion. Specifically, as this individual is both subject to, and a participant in, her state of being, and in her state of becoming, the reconstruction of such an individual has to be premised on looking closely at the discourses of her every day, mundane interactions, and of her critical sensemaking of these discourses. This individual is intimately involved in the critical sensemaking of her web of daily interactions. She recreates these webs of productive, and oppressive, discursive relationships. These productive and oppressive relationships can result in her movement to the periphery thus becoming the Other. What's exciting about these productive and oppressive relationships reproduced in discourses is that this movement to the periphery is not a stable state, as it involves both

of these productive and oppressive power-relations (Knudsen, 2006). Exclusion then does not need to be the only state of being or becoming for an individual!

Putting these three experiences together, how do I apply these forms to the analysis of data collected? The value-infused stories and narratives shared in the interview process capture both the said and the unsaid, not in a constant stream of information but as interrupted evidence that I must constitute back together. I must build this evidence in this way so that I am able to study the clusters of power-relations (Flyvbjerg, 2012). The literature and the theoretical arguments presented so far support the idea that the individual reconstitutes the meaning of their daily life. It becomes my job to bring to light these political interests which may be hidden. This state of hiding refers to the existence of underlying assumptions that are shared in fragmented stories and narratives which may not be visible at first glance. Patterns do emerge where a recurring story theme emerges, such as in Eliya's discourses surrounding the 'Elite' anchor point, or where an individual may alter plot lines and motives to suit themselves. The challenge in analyzing such fragments is to look at what the discourses protect with respect to power-relations (Flyvbjerg, 2012), and not necessarily what they are promoting on the visible surface.

I turn to an example to bring these ideas forward. A STEM-professional woman shares a short narrative with me where she was told by the chair of the meeting the following:

I was told I was to be a mediating force in this meeting.

In this mundane, everyday discourse of work, this STEM-professional woman has just been attributed the 'Mediator' anchor point. This mundane discourse influences and molds expectations of what that individual is 'to be' within that particular

event/experience. Furthermore, her critical sensemaking of this anchor point, shared via a continuation of this narrative, could follow along such lines as (in no particular order):

- (1) “I felt empowered”, or
- (2) “I felt I was being put in a position that a woman would be put in”, or
- (3) “I have no idea why I was told to mediate. What has it to do with me?”

This suite of possible fragmented narratives surrounding the anchor point brings to light many themes including the self, and the power-relations at work. First, the chair of the meeting and his/her discursive processes enact a positioning and ordering of this woman within this specific meeting. Second, how this STEM-professional woman interprets, through her critical sensemaking processes, this anchor point presented in (1), (2) and (3) can reveal a pattern, an alteration of the plot, a boundary, etc. For example, narrative (2) could be interpreted as reflecting an exclusionary discourse and critical sensemaking experience, positioning this STEM-professional woman as the Other. In contrast, narrative (1) could be interpreted as an opportunity, productive discourse (and critical sensemaking). In either of these narratives, to my interpretation, this STEM-professional woman is altering plot lines as she has the capacity to do so. In narrative (3), she is not altering plot lines or recreating a boundary. She is puzzled by this anchor point, not able (yet) to make sense of it. She may store it away for another day’s retrospective sensemaking, or she may completely forget it to name two possible avenues of many that are available to her. The point that I am making here is that I am interested, in this study, on narrative (2). This narrative recreates a boundary, a limitation, an order surrounding an anchor point attribution. This is where I can problematize power-relations, to reveal the power effects of anchor points.

Presenting the Complex Individual: Third “I” in Intersectionality

In the previous sections, I talked about the complex individual, mapping their discourses, and untangling relationships to showcase experiences of exclusion. I have not yet described how to affect this mapping or how to present this individual. I provided myself as a test subject in Chapter One, in my own act of reflexivity, via some of my identities and my space industry stories. I summarized ‘who I am’ and ‘who I am becoming’ in Figure 2 to introduce the reader to the idea of how to graphically demonstrate a complex individual. I played with different ways of presenting this individual and, in the end, I found that a narrative description would confuse rather than enlighten. As a test case, when I initially tried to capture ‘who I am’ and ‘who I am becoming’ in a narrative, it became clear that the reader could easily get lost among this complexity. The map of identities reflecting the complex individual addressed (RQ1) and most of (RQ2), and reflected her self- and social-identities, anchor points, discourses and critical sensemaking processes much more clearly.

With respect to the relationship between anchor points and organizational rules and formative contexts, these could not easily be integrated into the individual’s map of identities. I then turned to fragments of narratives and stories, and extracted them from the transcribed interviews, reproducing them under various themes. These discursive fragments were presented in such a way to highlight the complexity of the context (rules, meta-rules, and social values) and the relationship with anchor points. These discursive fragments addressed the remaining part of (RQ2).

With respect to (RQ3), the relationship between the range of anchor points and the exclusion of STEM-professional women from management/executive positions within

this industry, I struggled on how best to convey the results of the analysis. I decided I had to map out a view from above. Recalling from the introduction to Chapter Four, I had you stand at the top of a ladder to look down at three puzzles laid out on a table. The puzzles – forms of context, knowledge, and experiences - were joined together via one ribbon, anchor points. When these three forms are looked at side by side, with the ribbon of anchor points running across these three forms, the experiences of exclusion begin to take shape. This treatment necessitated that I create a summary of the possible range of anchor points along with a sample of stories and narratives that were associated with these anchor points. I also needed a summary of the relationship between anchor points, and rules and values. The summary was best ‘seen’, I felt, in a table format. I was re-packing – as opposed to unpacking – the analysis results from (RQ1) and (RQ2) in such a way to be able to look at the experiences of exclusion with anchor points being the common thread. For clarity, I divided and presented these exclusion experiences by career stage as a sort of map through time, and space, of experiences.

Chapter 6: STEM Professional Women's Range of Anchor Points

This chapter, the first of three, presents the results of my analysis of the participant discourses. This chapter focuses specifically on forms of knowledge, that is, of identifying the range of anchor points for the STEM professional women who participated in this study. As such, this chapter not only acts as a way to answer research question 1 (RQ1), it also acts as a way to introduce the reader to the six STEM professional women and their self- and social-identities. I present these anchor points, for each individual, bringing in their stories and narratives as a way to provide depth to the presentation of these women's identities. I grouped these women by their respective work experience, designating them as either early, middle, or late in their career. I found by organizing the data in this way, it made the results easier to manage and to understand, especially given the complexity that is inherent in an individual.

I begin by presenting some general observations and findings focused on identities. Then I follow with the presentation of each STEM professional woman, beginning with their self-identities, then their social identities, and finish with their range of anchor points.

Identities: Observations and findings across all participants

Recalling from Chapter Three, self-identity is the “notion of who he/she is becoming” (Corlett & Mavin, 2014, p. 262). Social-identity consists of ‘inputs’ into this self-identity (Watson, 2008). Self-identities, I found, were easily traced in the participant's discourses. Social-identities were a little more challenging to finesse out of the discourses. They rested on my identifying the influences and ideologies in society, a participant's experiences in life, history, and their emotional attachments. I did find that, across all

participants' discourses, the social identities of being highly educated in their respective fields, their occupation, and of being 'female' and/or 'a girl' were present. With respect to this last social identity, typically cisgender and diversity scholars go to great lengths to identify that a woman is a cultural, social creation and recreation of an individual. I have, like others, adopted this practice. However, 'female' and/or 'girl' were used interchangeably and easily by all participants while 'woman' rarely appeared in the discursive practices of these STEM-professional women. Inenya was the only one to refer to 'woman', and this only in the discourses focused on 'woman' astronauts.

Anchor points across all the participants were a separate and distinct manifestation of social-identity. What made these anchor points distinct was that these identities can indeed be characterized as ephemeral, varying in time and in social experiences. The anchor points I found also reflected a spectrum from productive to oppressive power-relations within social interactions. These social interactions, reflected in the narratives and stories shared in the unstructured interviews, had a range of impacts on the study participants. Some of the participants would internalize these anchor points without realizing they had done so, while others were acutely aware of these attributed anchor points, and would react to them in ways ranging from accepting them to resisting them. Interestingly, some of the participants would use the anchor points in different settings, and in different social interactions than in the original attribution act. I found also that anchor points could be attributed by either men or women, managers/supervisors or colleagues. In other words, they did not exist only in a binary domain of men versus women, employer versus employee.

With respect to finding the range of anchor points, participants shared stories that showcased the attributed anchor points. I searched for and found stories that others tell about STEM-professional women. In some cases, I observed that some anchor points were less obvious to categorize as such. The CSM framework assisted in deconstructing the participant discourses to find those more difficult anchor points. This application of CSM forced me to take a closer look at the discourses, and to move away from my own retrospective sensemaking of identities. I gained confidence in this deconstruction by focusing, notably, on the relationship between anchor points and organizational rules and values (forms of context). There will be more on this point in the next chapter.

Finally, within the map of identities that I used to graphically represent each complex individual, the link between self- and social-identities is represented through the complex individual and their critical sensemaking of discourses. I did this to ensure that the untangling of identities was clearly mapped out to ensure that the reader would grow to understand who this individual is, and who she is becoming. Also, there is no visual relationship between self-identities and anchor points in this map. Anchor points are visually connected to social-identity as these anchor points are attributed by an individual to the STEM-professional woman. Anchor points are then a subcategory of social inputs into who she is and who she is becoming, and the map reflects this. Some of the participants, Vigrine in particular, frequently used their attributed anchor points almost as self-identities. What is important here is the map reflects the construction of the concept of identity, made up of self- and social- identities and, with the addition of anchor points. All three identity constructions then “ stand at the intersection of self-perception and the perception of others” (Hearn, 2002, p. 40). Therefore, the map of identities reflects these

intersections. The map also reflects the critical sensemaking of each individual, and of their discourses. In other words, the individual's identity depends on what discursive situation they find themselves in. Their identity can also depend on the relational activities that the person is involved in. The map then reflects something between enunciation, and critical sensemaking, and each relies on fluid identity points.

With these findings and observations in mind, I now present the results of my analysis of discourses from the participants of this study.

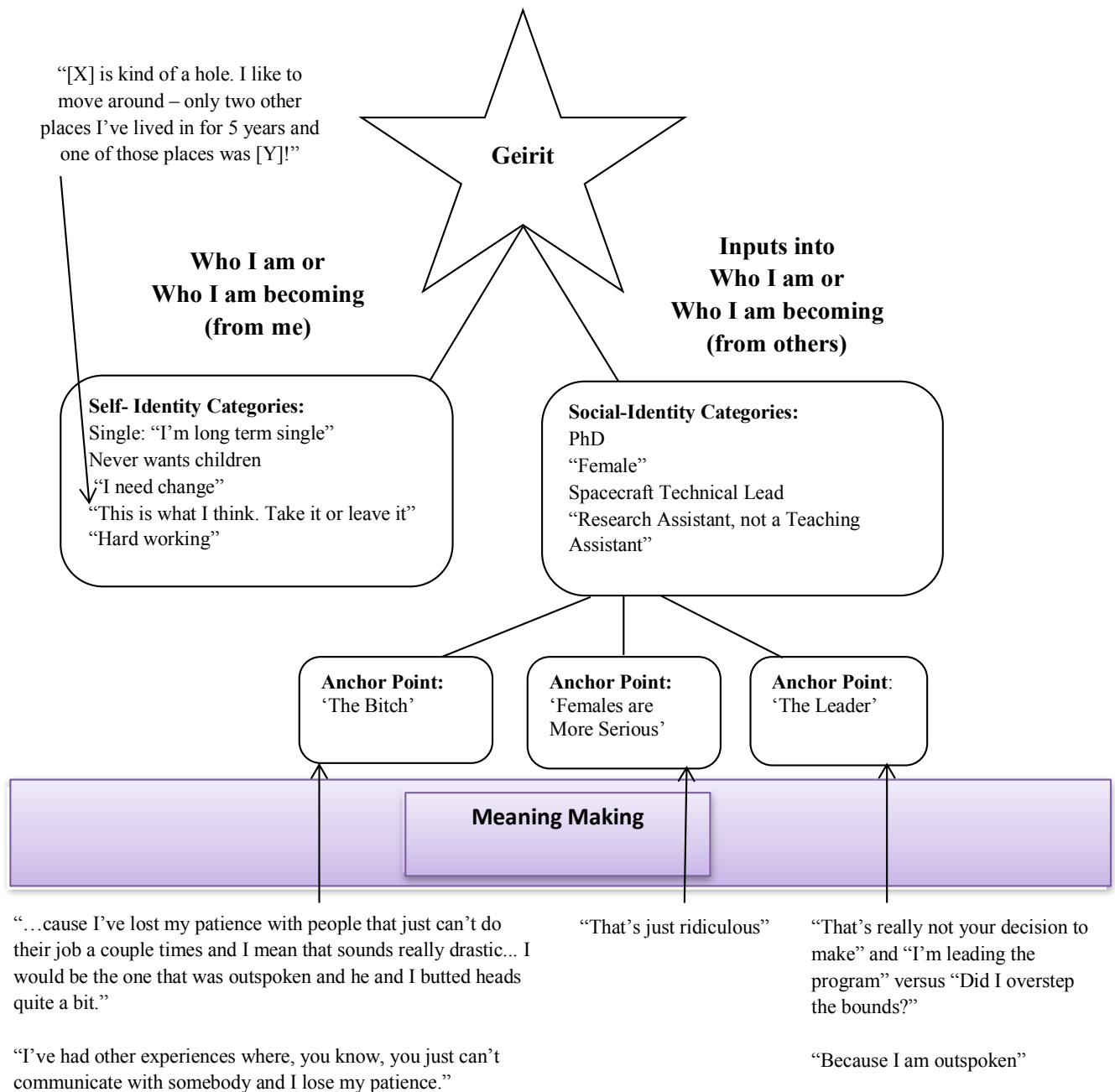
Early Career

Geirit

Geirit worked within a private Canadian space organization that I will call the Yellow³⁴ Company. She was internationally educated and had gathered occupational STEM experiences beyond Canada's borders. Her discourses brought to light much of 'who I am' and 'who I am becoming'. They also revealed an interesting range of anchor points attributed by others to her. All these identities, self- and social- identities, and anchor points, are presented in Figure 7. Note that the meaning making layer for all participants' identity maps will be addressed in Chapter Eight, forms of experience.

³⁴ I made an attempt to use 'cisgender-less' color names – if such a thing exists - based on findings from a survey run by xkcd and plotted by Worley. The interactive map of these results can be found at <http://www.datapointed.net/visualizations/color/men-women-color-names-d3/>

Figure 7: Geirit's Map of Identities



Geirit’s stories and narratives centred on ‘who I am’ were clearly stated and repeated during her interview. She emphatically self-identified as someone who never wants children and that she is ‘long term single’. She also underlined that she ‘needs change’.

One discursive example of this need for change is provided above her self-identity box, in Figure 7. Here she compares where she lives now, and her need to get away from that place. She also self-identified as being very hard working, and that others can ‘take it or leave it’ when it comes to what she thinks.

As for her social-identities, I searched for and found inputs into ‘who I am’ and ‘who I am becoming’ within her storytelling. These identity inputs were influenced by such ideologies as academic credentials, job titles/occupations, and attachments/emotional involvements. These two statements are important as I struggled with the categorization of identities, across the self and the social. I turned to the literature, in particular Clair et al. (2005), looking for guidelines on how to group these identities. However, I found by blindly stating cisgender is a self-identity or a social-identity, I was moving away from what the participants told me about who they are, and who they are becoming. I therefore learned to listen to their stories and narratives in such a way to be able to categorize identities in their respective maps. Returning to Geirit’s social-identities, I found that she was socially constructed as being the ‘Technical Lead’, and as being ‘a PhD’. She also staunchly defended that her first job title was a ‘Research Assistant, not a Teaching Assistant’³⁵. Geirit’s STEM social-identities – PhD, Technical Lead, Research Assistant - interacted and were interdependent with each other. These interacting, interdependent social-identities were seen throughout her technically-based stories such as this one:

[I have] a lot of experience in the beginning and the end [of project management] from [a] systems perspective...we’re all ISO certified in all that, which means we have to have all of our procedures defined. So we have things, like we always write a design and development plan that defines what you’re going to do in the project and how you’re going to, you know, perform the reviews and how you’re going to manage

³⁵ There is an implied hierarchy in this social-identity designation.

this and manage that. So, you know, processes like that we can really define how we want it to be for the program.... During and after launch of a problem satellite, [I noticed that]: “Oh everybody else is on a beach... I’m here working. They pretty much trust me to do what I want to do”

This story highlights her interdependent social-identities, that is, a project manager (‘Technical Lead’) and a systems engineer, and also foregrounds her technical knowledge given her ISO certification knowledge. This story also demonstrates the ideology of merit and skills that can be embraced by women in this industry, as Faulkner (2000) and Morgan (2000) found. To Geirit, her technical know-how made it such that others could go to the beach, and let her deal with a ‘*problem satellite*’.

Geirit’s range of anchor points that I found after applying the CSM framework included ‘The Bitch’, ‘Females are More Serious’, and the ‘Leader’. Starting with ‘The Bitch’ anchor point, she recounted to me how she had been named as such:

‘Cause I’ve lost my patience with people that just can’t do their job a couples times and I mean that sounds really drastic...Yeah, so not the manager that hired me, but the manager after him...we worked together on [specific project] ... and he didn’t really see eye-to-eye with the rest of the team, and I was the most outspoken member of that team... But, you know, we’d be doing the formal testing and we’re analyzing and looking at the data, doing the formal review of the test results and nobody would really know where he was coming from and I would be the one that was outspoken and he and I butted heads quite a bit... we were always arguing... Yeah, you know, “Why are you worried about that?” “That’s not a problem” or “Why aren’t we doing it this way?” or “We should do it that way” or whatever. I’ve had other experiences where, you know, you just can’t communicate with somebody and I lose my patience. I don’t hide my frustration as well as I should.

The stories surrounding ‘The Bitch’, including the one presented above, revolved around Geirit losing her patience and stating emphatically that she was in charge at meetings. She admitted during our interview that she tried, at times, to assume this attributed ‘The Bitch’ anchor point but that she struggled with it and the implications of being

characterized this way. Notably, at one meeting she found herself having to tell others that ‘this is not your decision’. She then left the meeting to try and find her immediate supervisor in order to ask him if she had overstepped her bounds by using this attributed ‘The Bitch’ anchor point in the meeting. This particular story will be examined further in the next chapter, in order to untangle the rules at work in her particular social reality, and their relationship with this anchor point.

Geirit was also ascribed the anchor point of ‘Females are More Serious’:

So, I was in Texas. They came over for like an annual review meeting. I presented some stuff on what I was doing. They said, “Hey, do you want to come work for us?” I was like, “[Specific location]!? Okay.”... And then they said, “Well we can’t hire you. We can only hire you as a student. Do you want to do your PhD with us?” I was like, “Fine.” So, I’m there for a couple years, and everybody that started after me was female and I said flat out to one of the managers, “This is weird. Why – I mean, I know what the statistics are – the number of people in school, right?” And he told me that: “We prefer to hire females because we find that they’re more serious about their work than the guys are.”

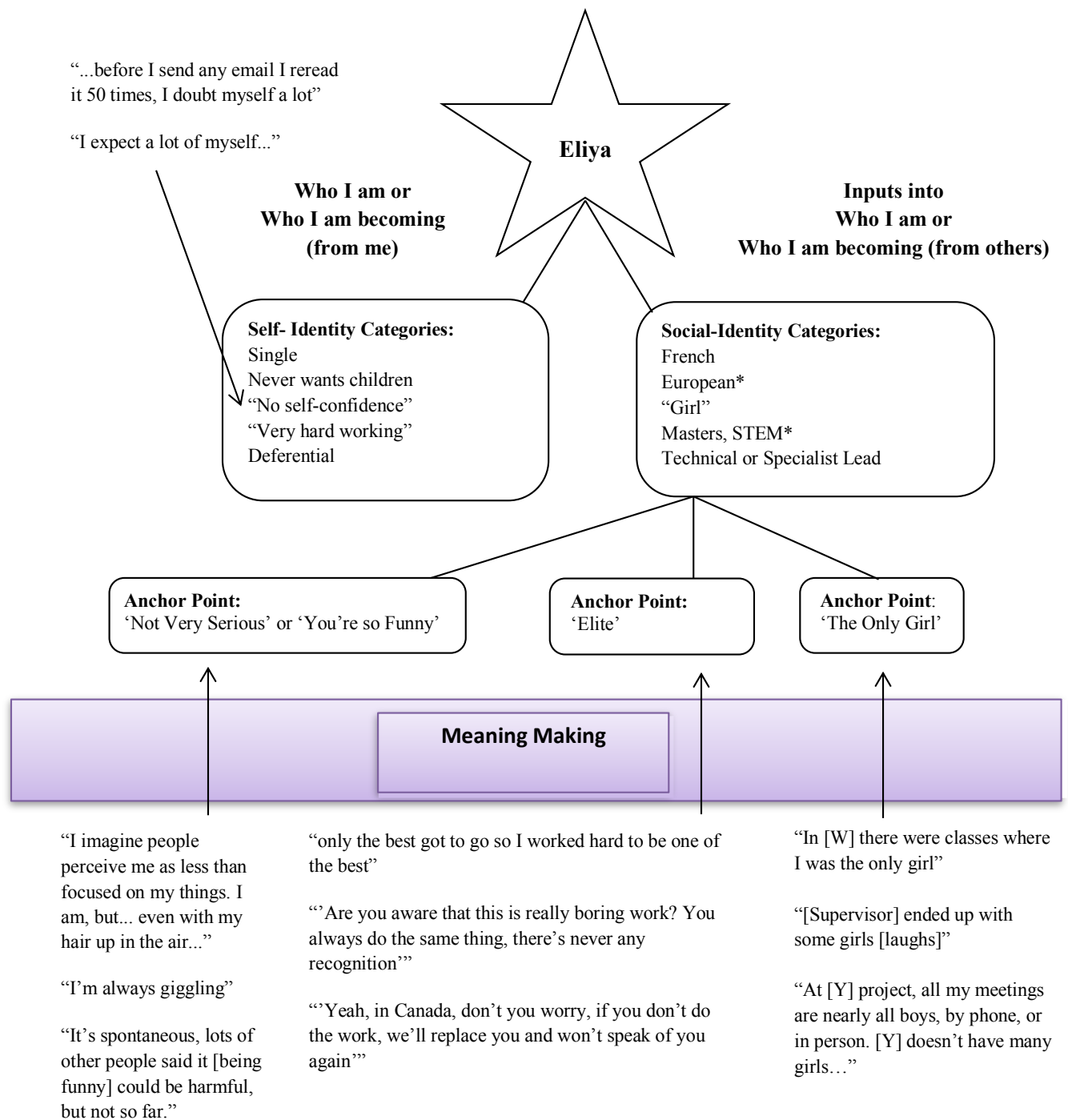
Her stories surrounding this particular anchor point were permeated with resistance discourses. Specifically, her response to this previous story focused on her skills and her merits and that this is what makes her serious. She believed that her ‘female-ness’ had nothing to do with her abilities. I will consider this ‘female-ness’ issue further in Chapter Eight, under her dominant ideas and practices.

Finally, the attributed ‘The Leader’ anchor point was, according to Geirit, a reflection of her technical knowledge and skills, and in some instances reflective of her outspokenness. In contrast to the cisgender ‘Females are More Serious’ anchor point, she welcomed and tried to assume ‘The Leader’ anchor point in her work environment. Note that Geirit’s social-identity of ‘Technical Lead’, and the anchor point ‘The Leader’, are

not one and the same. A ‘Technical Lead’ is an occupational position, akin to being a supervisor with subordinates. Being called ‘The Leader’ reflects different organizational behaviours, such as influence, vision, and motivation (Bratton & Chiaramonte, 2007).

Eliya

Eliya worked within a private Canadian space organization, Company Green. She also has an international educational and occupational STEM background beyond Canada’s borders, similar to Geirit’s. The results of the CSM analysis in search of her identities are presented in Figure 8.

Figure 8: Eliya's Map of Identities

* To protect participants, I must hide her/his specific cultural, academic identities.

Eliya’s sense of ‘who I am’ was shared with me in a number of her stories and narratives. Some of her narratives, centred on her stated lack of self-confidence, are in the

box above her self-identities in Figure 8. Eliya did clearly state that, like Geirit, she does not want children:

Interviewer: Do you see yourself having a family? Having kids?

Eliya: No, I never really wanted any. People always said “You’ll see when you are 30”, and I’m [specific age] now. “You’ll see when you’re 30, it’ll hit you like a ton of bricks”, but no, it hasn’t changed yet. I tell myself that I didn’t do all this studying... If you are not able to compromise on your career, you aren’t offering your kid much. And for me, I’m not ready to make that compromise so there’s no point in having kids. I suppose it could change, never say never...

Eliya’s discourses on this question of children appeared to be more a back and forth dialogue she was having with herself. Eliya also repeated in a number of her stories, whether it be with respect to school or her work experiences, that she identified herself as being very hard working. She also shared that she wants to be the best at whatever she does, to the point of compromising her health:

I really feel as though I gave my all during my studies... for now I gave my all when I was a student and I don’t want to study anymore. There was a year where it wasn’t working out, yeah I wasn’t feeling it and I wasn’t very good, I ended up with three ulcers, that was horrible.

Eliya’s self-identities extensively permeated her discourses and, as a result, I found it more difficult to find and extract her social-identities and her anchor points. I had to review the transcripts a number of times beyond what I had described in the methodology. This labour-intensive analysis of her discourses was counter to my own retrospective sensemaking of the actual interview, which left me with an overall feeling of happiness and of being refreshed. She was, simply stated, a free spirit - a temporary anchor point that I attributed to her. Having said this, with respect to her social-identities, I adhered to the idea that social-identities are influenced by ideologies such as academic

credentials and job titles, and Pavlenko's (2001) call to include language in the (re)creation of asymmetries as an ideology³⁶. Eliya identified as a graduate of a prestigious European system of education, graduating with a STEM Master's degree the specifics of which I must hide to ensure participant confidentiality is maintained. Similar to Geirit, Eliya's STEM social-identities interacted and were interdependent with her 'girl'-ness. Specifically, she expressed high-level technical jargon with what I can only call her own feminine 'girl' flair. This feminine flair I can best represent via her physical outward presence: in the interview, which occurred right after her work day, she wore the latest fashions embracing a 'girly', 'free' interpretation of this fashion. With respect to her use of technical jargon, she shared a number of stories that highlighted her growing knowledge in the technical fields she worked in, matching my expectations (given my own technical experience and space industry background) for a highly knowledgeable individual working in this industry. She also specifically chose to conduct the interview in French, adding to my understanding of who she is, and who she is becoming.

With respect to Eliya's range of anchor points, my application of the analysis framework showcased three anchor points: 'Not Very Serious'/'You're so Funny', 'Elite', and the 'The Only Girl'. Eliya's first anchor point, 'Not very serious'/'You're so funny', I found myself attributing this anchor point to her in the interview process, mirroring others in her entourage who attributed this anchor point to her. I did this without realizing I had done so, stating that she was 'so funny' and 'refreshing'. This anchor point was challenging to identify since I could easily categorize it as a self-

³⁶ I chose to focus on French as a cultural ideology. I could have also done the same for English interviews; however, those participants that spoke English did so without clearly identifying this ideology while French-speaking participants made this request.

identity. I had to return to the definition of anchor points to ensure I was considering her discourses plausibly. Notably, that they are concerned with inputs into ‘who I am’ and ‘who I am becoming’, that they are temporary/ephemeral, that they are reproduced in discourses, and perhaps most importantly that they reflect power-relations among individuals interacting together. Eliya played with this identity, at times unsure of it in the sense that she wasn’t sure if she wanted to embrace it or not:

It’s spontaneous, lots of other people said it [being refreshing/funny] could be harmful, but not so far. I think something I discovered here, one of my strengths is that I don’t stress over losing my job, and that allows me to... I tell myself that it doesn’t matter if it doesn’t go well, there are things I can try, but yeah... I’m always a bit worried because so many people have spoken up about it.

Given my own impulse to use ‘You’re so Funny’ in my exchange with her and her uncertainty as to whether this was who she is, I decided that it was plausible that this identity was not yet a self-identity, and that it was rather an anchor point that she was navigating in our interactions, and with others.

Moving to Eliya’s next anchor point, I found that the ‘Elite’ anchor point was attributed to her via a number of individuals and experiences through time, both in her STEM educational pursuits and in her space industry experience. Excerpts from some of the discourses focused on this anchor point are captured in the making of sense layer presented in her map of identities. Notably, while pursuing her European education, she found that “*only the best got to go so I worked hard to be one of the best*”. Similarly, her manager would tell her that: “*we’ll replace you and won’t speak of you again*” if you weren’t up to the challenges of working in the space industry.

Finally, ‘The Only Girl’ anchor point was reproduced in a number of Eliya’s discourses:

In the U.S., there were classes where I was the only girl. Or we were two among 30.

My internship was making flooring for [specific company], and yeah I was pretty much the only girl, and there were so many times that, well the others were a bit rough around the edges.

The demographic reality of this industry, as presented in Chapter Two, supports this attributed anchor point. There were, and continue to be, few STEM-professional women who work in this industry, reflecting this ‘elite’ status. In Eliya’s discourse, I found that of all the participants, this ‘elitism’ pervaded her discourses throughout the interview. In addition, the attribution of ‘girl’ (as opposed to ‘woman’) in Eliya’s case is important to recognize. As I presented earlier in this chapter, cisgender and diversity scholars go to great lengths to identify that a woman is a cultural representation of an individual. However, Eliya used ‘female’ and ‘girl’ interchangeably and easily, while ‘woman’ almost never appeared in her discursive practices. With respect to this attributed anchor point, her supervisor, a STEM-professional man, was surprisingly presented as the head of a harem of ‘girls’:

Interviewer: *So now, in your area at [Company Green], are you the only woman on [supervisor’s] team?*

Eliya: *No, [specific supervisor] ended up with some girls [laughs]! No, there are... there’s [woman #1], [woman #2], [woman #3] and there’s [woman #4] in [specific location]. No, really the team isn’t bad, yeah?!*

Interviewer: *Ok it’s pretty diverse?*

Eliya: *There are [specific number] of us total, and yeah there are more boys, but there are four girls.*

In this particular hierarchical structure, Eliya’s supervisor had apparently made an effort to staff positions that would be filled predominantly with women. However, in this STEM social reality most meetings or social encounters in this industry, women are often

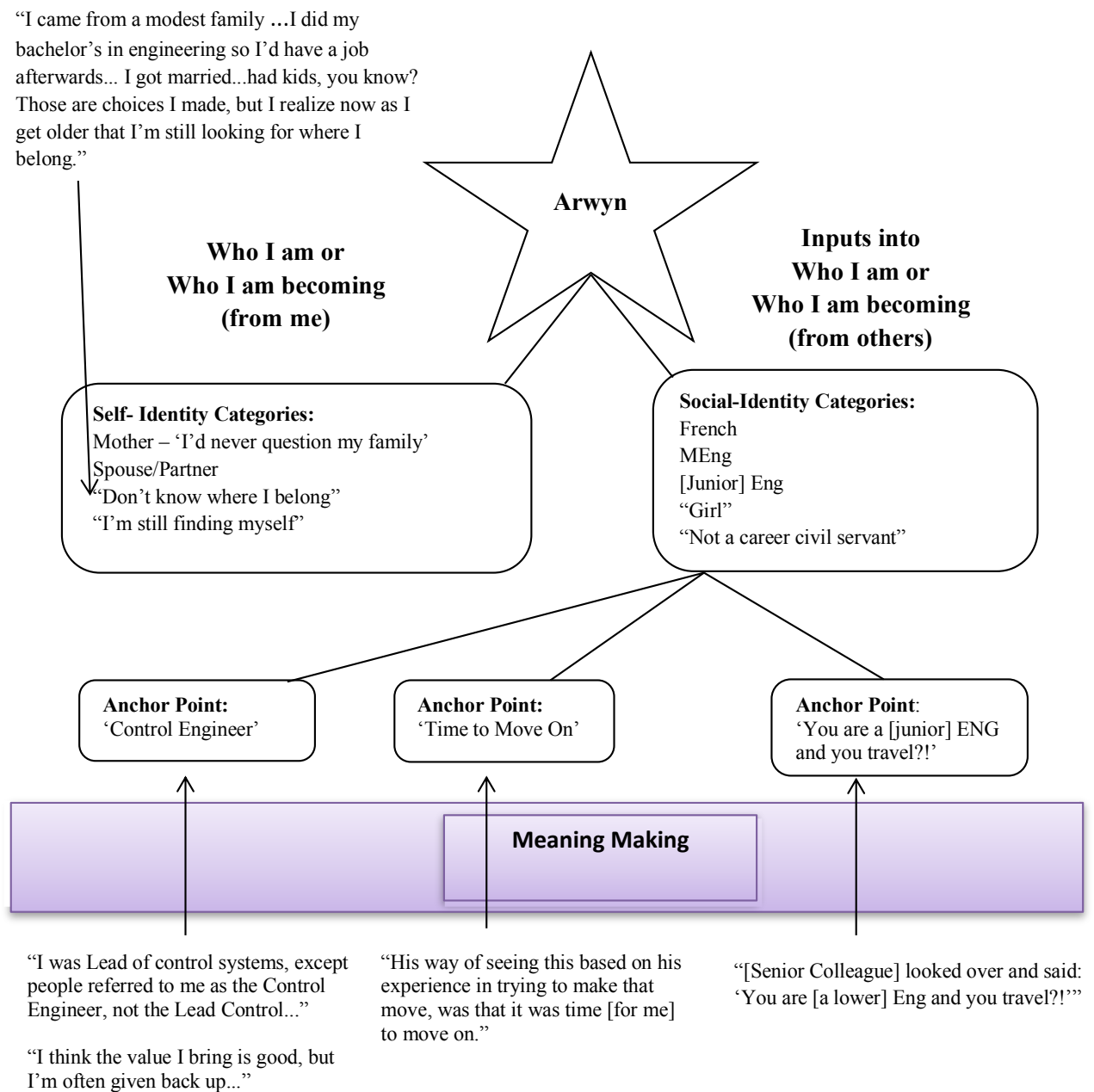
the only one present. For Eliya then, she saw the disparity of her day-to-day interactions: at times, she was ‘The Only Girl’ around the table, and then at other times, she would return to her unit and find herself among the “*harem of girls*”.

Mid-Career

Arwyn

Arwyn worked within a public Canadian space organization. Her educational and occupational STEM background was from within Canada’s borders unlike Geirit’s and Eliya’s experiences. Her discourses revealed an interesting range of identities, self- and social- identities, and anchor points, which are presented in Figure 9.

Figure 9: Arwyn's Map of Identities



Arwyn's sense of 'who I am' was shared with me in a number of stories. She felt at ease to share with me that she wasn't sure where she belonged, and that she was 'still' finding herself. This sense of finding herself was in contrast to her acknowledged self-

identity of being a mother and of being married to her husband. In contrast to Geirit and Eliya's discourses of being single and of not wanting children, Arwyn's self-identity as a mother, and her partnership with her husband, were central to her:

[I am] part of the operations environment: you never know what will happen. I know that I've got my family in my corner, I'm lucky that my spouse is not a constraint for me, I don't have a spouse who can't handle dinner, he knows where the kids go to school and if one of them is sick, I can call him and he will go pick them up. It's not because I'm the mommy that I'm always available.

With respect to Arwyn's social-identities, they included her occupation of being a junior engineer in spite of her holding a Master's degree. Arwyn's STEM social-identities interacted, and were interdependent, with her status as a 'girl', in a slightly different way than in Eliya's case. Arwyn made numerous references to such things as how well the 'girls' were treated by the 'boys' in university, or in her discursive processes of questioning her lack of promotion: *"It's too easy to say 'I'm a girl, that's the reason'. I think it's a lot more complex than that"*. As for her use of technical, STEM jargon, she shared a number of stories that reflected her extensive knowledge across the many technical fields she worked in, again matching my expectations for a highly knowledgeable individual working in this industry. I must also note that, similar to Eliya's interview, Arwyn's interview was also conducted in French, at her request. I've highlighted previously that while she chose to conduct the interview in French, the cultural ideologies are of importance in recreating the social-identity of being French.

With respect to Arwyn's range of anchor points, I chose to focus on three out of five possible anchor points found after the application of the CSM framework. I chose to exclude one in particular as, I felt, it would reveal too much of who she was 'becoming' thereby exposing her participation in this study. The other anchor point that I excluded

was ‘The Only Girl’ anchor point, which was found across almost all participants. I believe that the presentation of ‘The Only Girl’ anchor point, in Eliya’s range, sufficiently captured this anchor point. As a result, the three anchor points for Arwyn that I focused on were: ‘Control Engineer’, ‘Time to Move On’, and ‘You are a [junior] ENG and you travel?!’.

Arwyn’s first anchor point, the ‘Control Engineer’, came forward in her stories and narratives with respect to a number of projects she was involved in. In spite of Arwyn’s extensive education and various work assignments/experience, and the assigned occupational position of ‘Lead Control’, she was often treated as the ‘*backup*’ or in the space industry, the ‘Control Engineer’:

I was Lead of control systems, except people referred to me as the Control Engineer, not the Lead Control, stuff like that. That’s really where I felt the difference. I think the value I bring is good, but I’m often given back up, or projects that [are]...Yes, less demanding. I had to really push my colleagues to get something.

I introduced the difference between occupational position, such as ‘Technical Lead’ or ‘Lead Control’, and ‘Leader’ within Geirit’s map of identities. Expanding on the occupational position of being a ‘Lead’ in the space industry, being identified as such reflects a level of responsibility and technical know-how that garners respect and that creates a structural hierarchy of decision making and responsibility. In other words, those individuals that report to a ‘Lead’ are considered under the ‘Lead’, where these ‘Control Engineers’ subordinates provide services and expertise in certain sub-sections of a project, or a payload, in question. The ‘Lead’, it is assumed, knows the entire project/payload extensively, and is responsible to coordinate all inputs into one coherent system. The ‘Lead’ is also responsible for the entire system, and is in theory then

accountable for the delivery of said system. The ‘Control Engineer’, on the other hand, is only responsible for one small aspect of the project, and reports to the ‘Lead’ for that one aspect. By assigning the hierarchical lesser position of ‘Control Engineer’, Arwin was being positioned under others in spite of her occupational designation.

The ‘Time to Move On’ anchor point reflected her extensive STEM educational, operational, and acting appointments experiences along with her cisgender. In spite of some arguments that state that women are not able to travel due to family responsibilities, or that they haven’t acquired ‘enough’ (whatever that measure of ‘enough’ may be) operational experience, Arwyn’s case does not fit such stereotypical arguments with respect to her inability to move up the corporate ladder. She has, simply stated, extensive operations and acting experiences which did not work in her favour:

Arwyn: Well I went to [senior manager] since I was still exploring...So I decided that he was the one to speak to, you know? But as I got [another manager’s] reply, and his way of seeing this based on his experience in trying to make that move, was that it was time [for me] to move on.

Interviewer: What does that mean?

Arwyn: Like quit and move on to other things.

The third and final anchor point, ‘You are a [junior] ENG and you travel?!’, was reproduced only once in Arwyn’s discourses. It left such an impact on both of us, however, that I believe that it needed to be captured here:

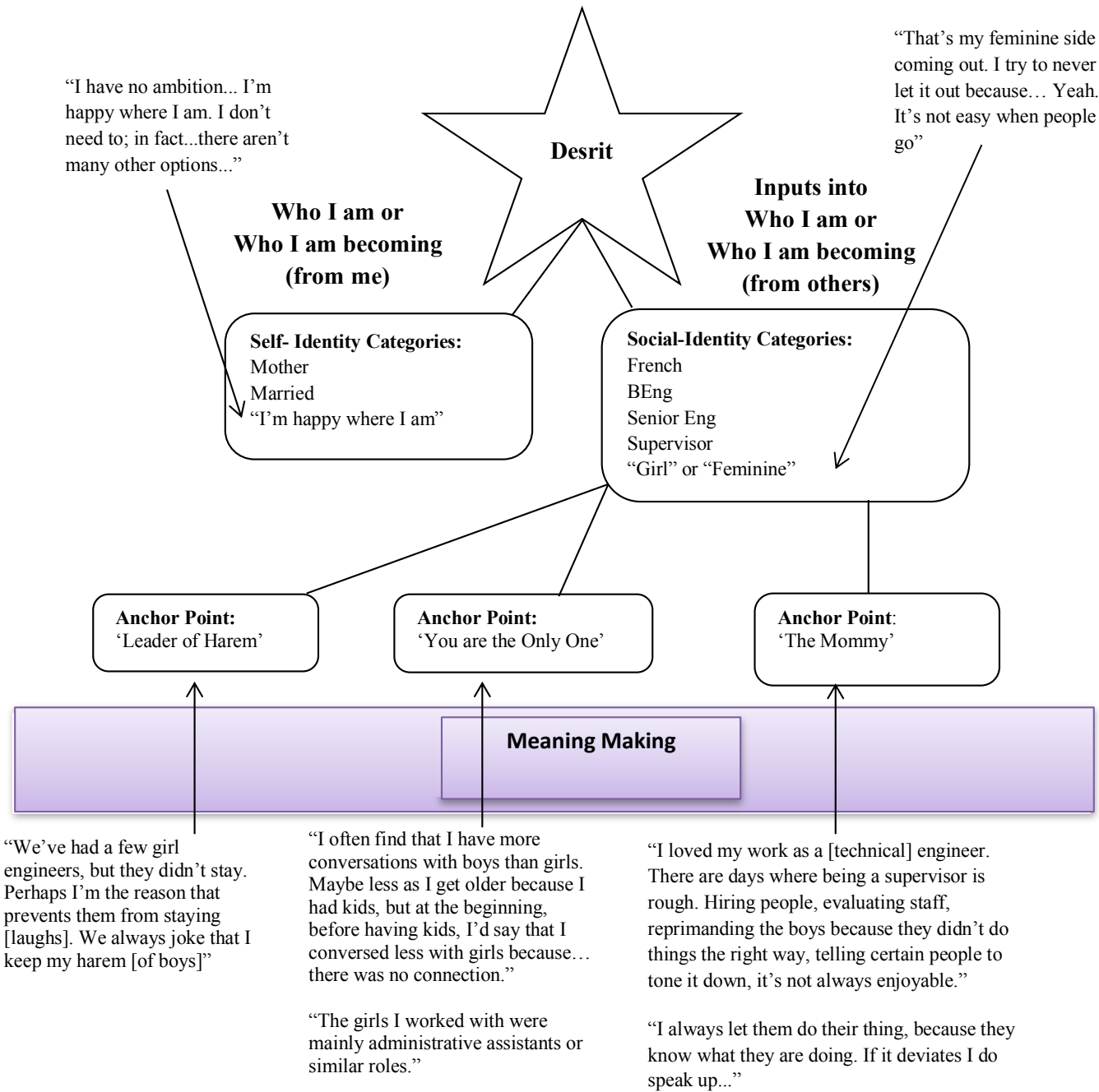
I still managed things that were above my employee level, and I think when [colleague] and I started realizing it was when we did our deployments to [particular department]. It came to light that we were going to Ottawa for something, and [senior colleague] looked over and said: “You are [junior] Eng and you travel?!” Well, yeah, like always. “Yeah, they let us leave with passports and suitcases in hand!” [laughs].

This attributed anchor point reflects the reproduction of a hierarchy, that is, that one is not supposed to travel if one is in a junior engineering position. This story also reflects the literature on military and engineering as far as recreating hierarchies (Hacker, 1981, 1989). In addition, this anchor point reflects Jorgenson's (2002) findings with respect to discursive performances of women engineers, in a male-dominated profession, where humor can be adopted to support their status as being a 'qualified professional'. In Ruel, Mills, and Helms Mills (2017) efforts to write women in the space industry into history, they surfaced the use of humor to position women as objects that represent a feminine ideal. While this story does not refer to cisgender explicitly, Acker (2006) does point out that cisgender (and race and class) "are usually present" (p.444) in inequality regimes. This cisgender inequality regime can be surfaced via Janssens, Cappellen and Zanoni's (2006) findings with regard to successful female expatriates. In particular, their findings supported their first proposition; notably, that "structural barriers encountered by female expatriates are related to three key power-laden discourses structuring the international contexts in which they operate: cisgender, hierarchy, and culture" (Janssens et al., 2006, p. 136). More specifically, the myth focused on the reluctance of managers to send North American women abroad was supported by their findings. Arwyn's story, while not explicitly addressing her cisgender, mirrors this male, senior colleague's understanding that a junior engineer, who is a woman, should not be travelling.

Late Career**Desrit**

Desrit worked within a small private Canadian space organization, Company Purple. Her educational and occupational STEM background was from within Canada's borders. Her range of identities is presented in Figure 10.

Figure 10: Desrit’s Map of Identities



Desrit’s sense of ‘who I am’ was difficult for me to find, but not quite as challenging as in Eliya’s case. Perhaps this exercise of extracting her self-identities was less obvious because she felt threatened by the idea of being part of what she called a ‘feminist’ study.

There was no doubt, right from the beginning of the interview, that she had definitive ideas surrounding feminism, and being part of such a study:

I didn't quite know what spin to give this [the interview], if it was more a feminist thing... the only thing I can tell you is that I picked a boy's trade but I have never, ever felt discriminated against at all in my career. Girl's lunches, this and that, and I went once at the beginning of my career and never again. A bunch of girls who get together to gossip about discrimination they are subjected to and the problems they have because they are women, I don't engage with that. I went once and lately a young engineer [female] contacted me and encouraged me to go and I changed the subject... but you walk right by, put them [men] in their place and show them a clean pair of heels. Sure, if you are talking statistically... sure maybe the average salary of a woman with the same experience is inferior, but that has not been my experience. I have always been paid fairly and I've never felt discrimination. Maybe boys like [man #1], I always got the impression that [he] doesn't like me because I'm a girl, but I had my character too and maybe he wouldn't have liked me any better as a boy. He and I just didn't connect very well.

Having shared her views on feminism within the space industry with me at the beginning of the interview, I've chosen to reproduce her discourses here with almost no editing on my part. I've done this to highlight that (1) when I did hazard to ask a direction question about discrimination in the space industry, this was representative of the responses I would get, and (2) she did speak more easily about who she is after sharing her story about discrimination, as if she needed to get this said to set the tone for the rest of the interview. Notably, she shared the trials and tribulations of raising a special needs child with me, reflecting her mother self-identity. She also shared her sense of partnership with her husband, a self-identity I captured via being 'married'. Notably, she, like Arwyn, had to negotiate home life and career life:

Interviewer: *Have there been times where you've been on call and you really couldn't come in because you...*

Desrit: *No, that's never happened. I always worked it out. I fought with my spouse at times because I left in snowstorms and he didn't want me to leave, but I can't not go.*

I'm on-call, I must go. That was perhaps the worst case, but it was mostly related to the weather. When you are on-call, that's the expectation, you don't have a choice.

Also, Desrit expressed a number of times that she was happy with where she was, referring to both her family situation and her work situation. Above the self-identity box, I captured one such narrative of 'who I am' related to her work.

With respect to Desrit's social-identities, she is a Senior Engineer and holds the occupational position of Supervisor. It is noteworthy that Desrit was the only supervisor and senior engineer I interviewed. These STEM social-identities were held separate from her 'feminine' side, as she stated and as I captured above the social-identity box in her map of identities. The sense I got from this narrative and others that were similar in nature was that it was difficult emotionally to be a STEM Supervisor, and that she did not want to share this emotionality, which she called 'her feminine side', with others. While some research (e.g. Kerfoot & Knights, 1998) may attribute this identity separation to wanting to embrace male attributes as a supervisor, I am not sure I can make such a statement based on the narratives she shared. With respect to her use of technical jargon, she again matched my expectations for a highly knowledgeable individual working in this industry. Similar to Arwyn's interview, Desrit's interview was also conducted in French per her wishes. I reflected this as a social-identity.

With respect to Desrit's range of anchor points, I was able to extract three: 'Only Girl Here'/'You are the Only One', the 'Leader of Harem', and the 'Mommy'. The 'Only Girl Here'/'You are the Only One' was attributed to Desrit in a similar fashion to Eliya's and Arwyn's attributions. With respect to the next anchor point, 'Leader of Harem', came forward in her stories in a number of ways. I captured one such humorous story in the

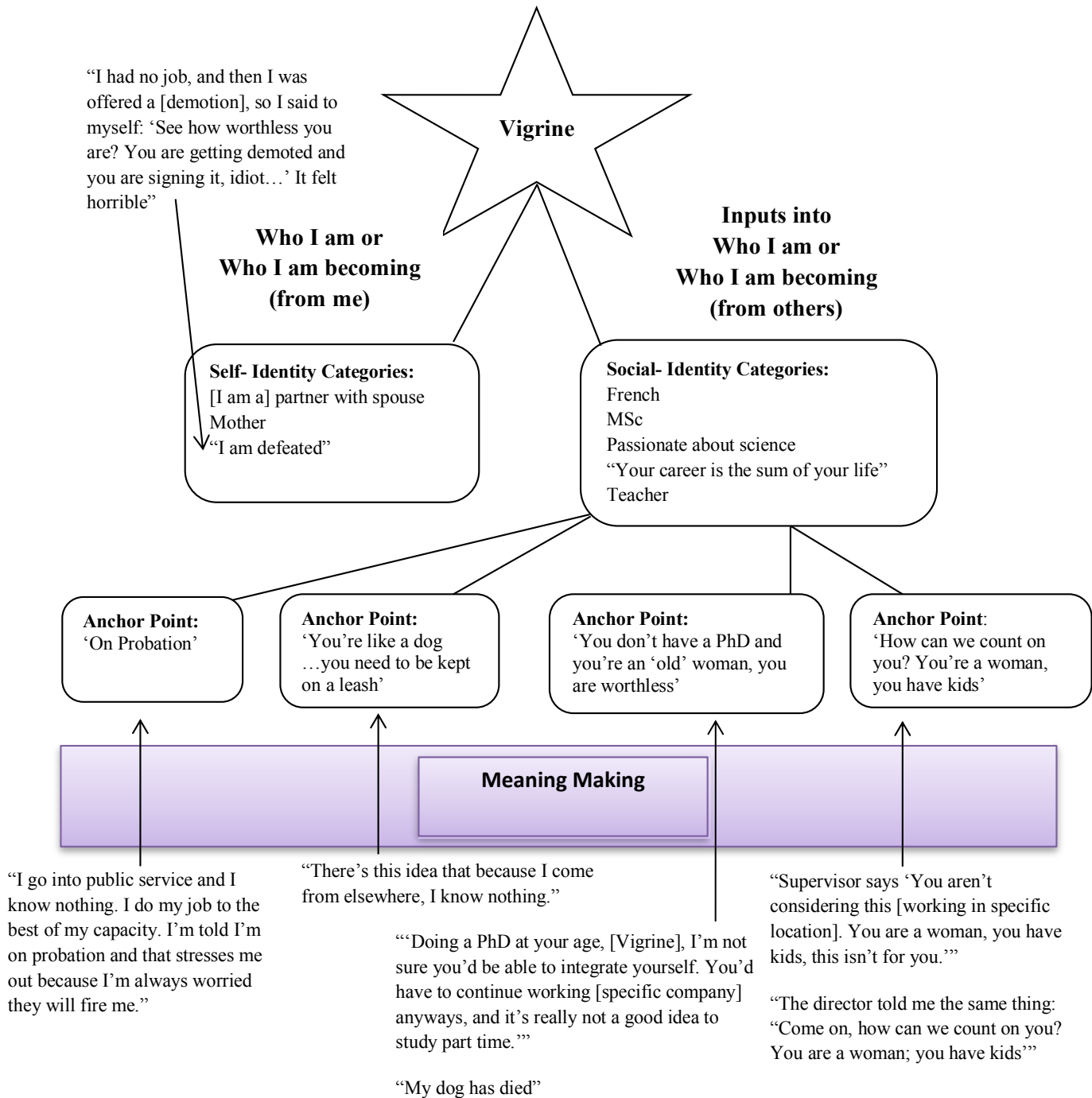
meaning making layer in her map of identities. When we consider the notion of harems in the past, they were specifically associated with one man and many women. Eliya's story referring to her supervisor, in particular, reflects this usual idea of a harem. Desrit's 'harem', however, turned this masculine ideal onto its head, where she is the head of a harem of men. While some may interpret this anchor point as her being a Queen Bee (Mavin, 2008), I have to point out that this identity refers to a woman who 'stings' other women if she feels that her power is at risk. I did not get the sense that this is what Desrit does, or feels, especially when you consider her social-identity of the 'feminine' side. She was almost in tears thinking about the women STEM professionals who had been part of her division, and who had left. Her story was such that she tried repeatedly to hire across the spectrum; however, all the STEM-professional women that she was able to hire left for other careers or due to family, and/or partner, responsibilities.

As for 'The Mommy' anchor point, this was an identity attribution reflecting her cisgender and her supervisory responsibilities. Specifically, her cisgender and STEM reality, working interdependently, required of her to: "*reprimand the boys because they didn't do things the right way, telling certain people to tone it down, it's not always enjoyable*". I say required of her because '*the boys*' do act, in this particular case, like '*boys*'. I substantiated this claim in Bramun's interview when we discussed such things as the toys that get thrown around the office, and 'porn video nights' where some of '*the boys*' would get together to watch pornographic movies in a conference room (that had three walls that were glass). This 'The Mommy' anchor point can be viewed by some as subverting Desrit, denigrating her to a 'caring' and 'nurturing' cisgender identity. My interpretation of this anchor reflects more of Simons' (1996) wish to consider and

acknowledge the “‘mother-made’ ” self” (p.180). By doing so, I am raising the question that perhaps we need to recognize this mother-made self, not as a victim but as a symbol of the power-relations involved between a mother-made self and others. This recognition of power-relations is not to say that Desrit accepted ‘The Mommy’ anchor point. She had, as evidenced in her ‘You are the Only One’ anchor point, shared with me the more masculine requirements of this industry while also feeling a need to quiet her ‘feminine’ side. My point here is that Desrit is complex, and that her cisgender reality can be reflected via ‘The Mommy’ anchor point just as it can be reflected by her ‘Leader of Harem’ anchor point. To say that she is only ‘feminine’, or only ‘masculine’, is short sighted, and limits her in her social world.

Vigrine

Vigrine worked within a public Canadian space organization. This participant’s interview was, by far, the most emotionally involving experience for me as an academic and as a STEM-professional colleague. There were many tears as she recounted her career journey, and I stopped the recorder a number of times, to allow her to compose herself. It seems trite on my part to highlight that her educational and occupational STEM background was from within Canada’s borders. It also seems trite to break her out into a range of identities. However, I must adhere to my chosen methodology and so I present this participant in this way, underscoring to the reader that reproducing her discourses here does not necessarily bring forward all the emotions that she trusted me with.

Figure 11: Vigrine’s Map of Identities

Vigrine’s sense of ‘who I am’ was extensively shared in her stories. One particular self-identity that stayed central was of being a partner with her husband:

My spouse and I planned to go work overseas. To put that in action, it was easier for me to teach high school so my bachelors gave me all the credentials I needed to

teach, so I get all my papers in order, I get a teacher's license for [a specific province] and we go to Africa, where I teach science: biology, chemistry, physics and earth science.... We left with [our child] for [Africa] and we were evacuated in military convoy because of the civil war. We lost everything... We still had our lives and [each other].

Vigrine, as did Desrit and Arwyn, negotiated home life and career life in her own way.

This navigation permeated her stories, reflecting some elements of her self-identity. In particular, her self-identity as a 'Mother' was clearly important to her, requiring her to sacrifice her STEM professional career at times:

I get pregnant again, and at that point it was considered a high-risk pregnancy, so preventative withdrawal at a time when it just wasn't done... But my doctor gave me the note to stop working, and when I went back to work, my boss tells me that I don't have a job anymore... I still remember the smile on the [boss'] face when he told me. He was very proud. Pregnant women, I don't know exactly, but he wasn't going to be had again by a pregnant woman leaving... But then I told myself that I wouldn't go back to work. The [company] offered me a job...and I refused it. I had too much trouble managing everything...I suffered the financial consequences, but I was very happy because I was at home with [my] babies.

Similarly, while looking for a new challenge in the space industry, she again found

herself negotiating her 'Mother' self-identity:

I had already told my kids that I had applied [for a new job] but I told them that I didn't stand a chance...So they weren't expecting it, but with the kids, and my eldest, we often spoke of going back to [a specific place]... And the day comes where I tell them that I got the job...My [child] reacted in a way I really did not expect, [child] doesn't care. My youngest was so nervous, cried every day, so that was harder to deal with. Two days before we made the move, my [child] says "I don't want to go anymore, I'm not moving, I'm not going", but "the ticket is purchased, you are coming", and we got to [specific place]. I still remember our first night, [child] walked around the house in about a minute and said "give me another ticket, I'm going back". And I tell [child] "there is no ticket, you are staying"

She also reflected on what it means to have a career and being a Mother:

Your career is the sum of your life. Your career was not the work, [a specific conference presenter] included being a mother as part of your career. That spoke

volumes to me, because I stopped making a distinction between being a woman who works - I work for eight hours a day, ten hours a day, and after that I am a mother, and after that a spouse, and then it's back to work. So this [idea] allowed me to make it a whole. My life is being a mother at work, a mother who works, so that reconciled things for me.

Vigrine also self-identified as one who is 'defeated' with respect to her work in the space industry. This self-identity manifested in her discourses many times, in many different ways. The following example is presented to give a view into what this 'defeat' looked like:

It was hell for me at work. Three weeks after getting to [specific place], my job was abolished.

In a meeting with his employees, [supervisor] says [to me]: "I told you to do this! How come you didn't? What were you thinking? What did you do?!" I was so conscious of the fact that he was putting me down in front of his employees...My relationship with [supervisor] was hard. That's where I lived one of the worst days of my career: at some point, I went to see [supervisor] and told him that there was something that was making me uncomfortable. He said "Yeah". Ok, I went back to my office and not too long after that I went back to [supervisor's] office and told him "I'm uncomfortable". He said "Listen, there's a limit to what your boss can accept in the 'I'm uncomfortable'", and I said "Ok, thank you", and I left. I went out defeated. Defeated...

With respect to Vigrine's social-identities, she was a STEM scientist who loved doing science and she shared this passion with me across a number of stories:

I did my Master's and loved [specific STEM area]! That's really where I discovered that I really loved it! I had studied science in [college], health sciences, [specific STEM area]. But at the Master's level, I really discovered a passion [for it]. That's it, I spent years fitting into a mould but finally I had really found what I enjoyed!

Vigrine also chose to conduct the interview in French. I captured this cultural social-identity in her map of identities, as I have done for the other participants who chose to proceed in French.

With respect to Vigrine's range of anchor points, after applying the CSM analysis, I found four attributed anchor points. These four anchor points were: 'On Probation', 'How can we count on you? You're a woman, you have kids'", 'You're like a dog ...you need to be kept on a leash', and 'You don't have a PhD and you're an 'old' woman, you are worthless'. With respect to the 'On Probation' anchor point, it came forward in a number of her stories focused on her STEM work experiences:

At that point, we were about [number of employees] at [specific Company] and then the cuts started. There were things happening on a financial level, things were going horribly. We went from [number of employees] to [60% of original number of employees] to [40% of original number of employees]. When we got to [30% of original employees], things got uncomfortable... Upon my arrival in [specific location for a business trip], the boss who sent me there was fired. So that signified that it was my final three weeks.

I go into public service and I know nothing. I do my job to the best of my capacity. I'm told I am on probation and that stresses me out because I'm always worried they will fire me. This was after at least two years at [another company] where everyone was being fired, one after the other. So, I can't believe that the public service doesn't fire people when their jobs are abolished. That doesn't make sense to me. So I'm very nervous, and then there's no manager [for Vigrine's unit]It was such an unstable time. I still don't understand how I made it through.

These discourses, and the accompanying 'On Probation' anchor point, are important because these stories highlight the unstable nature of this industry. Vigrine had learned to be resilient, in the face of such uncertainty, accepting, in a way, her attributed 'On Probation' anchor point. What is not clear in these stories is that this identity of being 'On Probation' lasted over many years, transferring from one company to another, and then to another.

Moving to Vigrine's 'How can we count on you? You're a woman, you have kids' anchor point, this attributed identity had clearly cisgender elements to it. This cisgender

anchor point came into play in a number of her experiences. Notably, the anchor point was attributed to her on the production floor, and again following her wish to take on responsibilities that would take her away from her family:

I acquired experience on the production floor. I'm not too proud of that because my studies are in science; I did a Master's, what am I doing on the production floor?! I worked in the warehouse with some people that frightened me [laughs]. They were vulgar. It was really not the place for me but that's life. So, I go and nobody ever bit me... So, I learned a lot and there were project opportunities.

I worked at [specific company] as a materials planner. After that, there were special projects. [Specific company] opened a factory in [specific location]. I volunteered to go and one boss tells me: "You aren't considering this. You are a woman, you have kids, this isn't for you". So, it was no, you aren't doing this. I went to see the director to tell him I was interested and he told me the same thing: "Come on, how can we count on you? You are a woman; you have kids".

This anchor point is in line with Arwyn's 'You are a [junior] ENG and you travel?!', reflecting a cisgender, and hierarchical, interpretation of the social working world of the space industry. The anchor point is, unfortunately, also in line with Janssens, Cappellen and Zanoni's (2006) findings with regard to female expatriates. In particular, the reluctance of Vigrine's managers to send this North American woman abroad reflects a reality for similarly positioned women; that the cisgender, cultural and hierarchical discourses can limit and bound women.

I was, in a way, prepared for the two previous anchor points to appear in Vigrine's discourses. I was not in the least prepared for the next anchor point: 'You're like a dog ...you need to be kept on a leash'. This anchor point was also closely related to the 'You don't have a PhD and you're an 'old' woman, you are worthless' anchor point. They were related because they were each attributed to Vigrine by one woman in two different social interactions. The visual image that 'You're like a dog' anchor point left me with

was shocking. What made it even worse for me was that this anchor point was attributed by another woman to Vigrine:

I went back to [a specific location] - I had been in the US - I went back [a specific location] to report to new [manager]... another hard phase, where I found it sickening. I am told: "You don't have a PhD, you are worthless...". I'm told "you're like a dog, don't take [this] wrong, it's just that you need to be kept on a leash otherwise you'll screw up".

I considered doing a PhD because I was belittled for not having one. I talk to [manager] about it who says: "You wouldn't want to go work in a different sector? In a company? You know, you worked in [specific area]. The industrial/aerospace sector wouldn't interest you? Doing a PhD at your age, [Vigrine], I'm not sure you'd be able to integrate yourself. You'd have to continue working at [specific company] anyways, and it's really not a good idea to study part time." I was... I knew then that my dog had died...

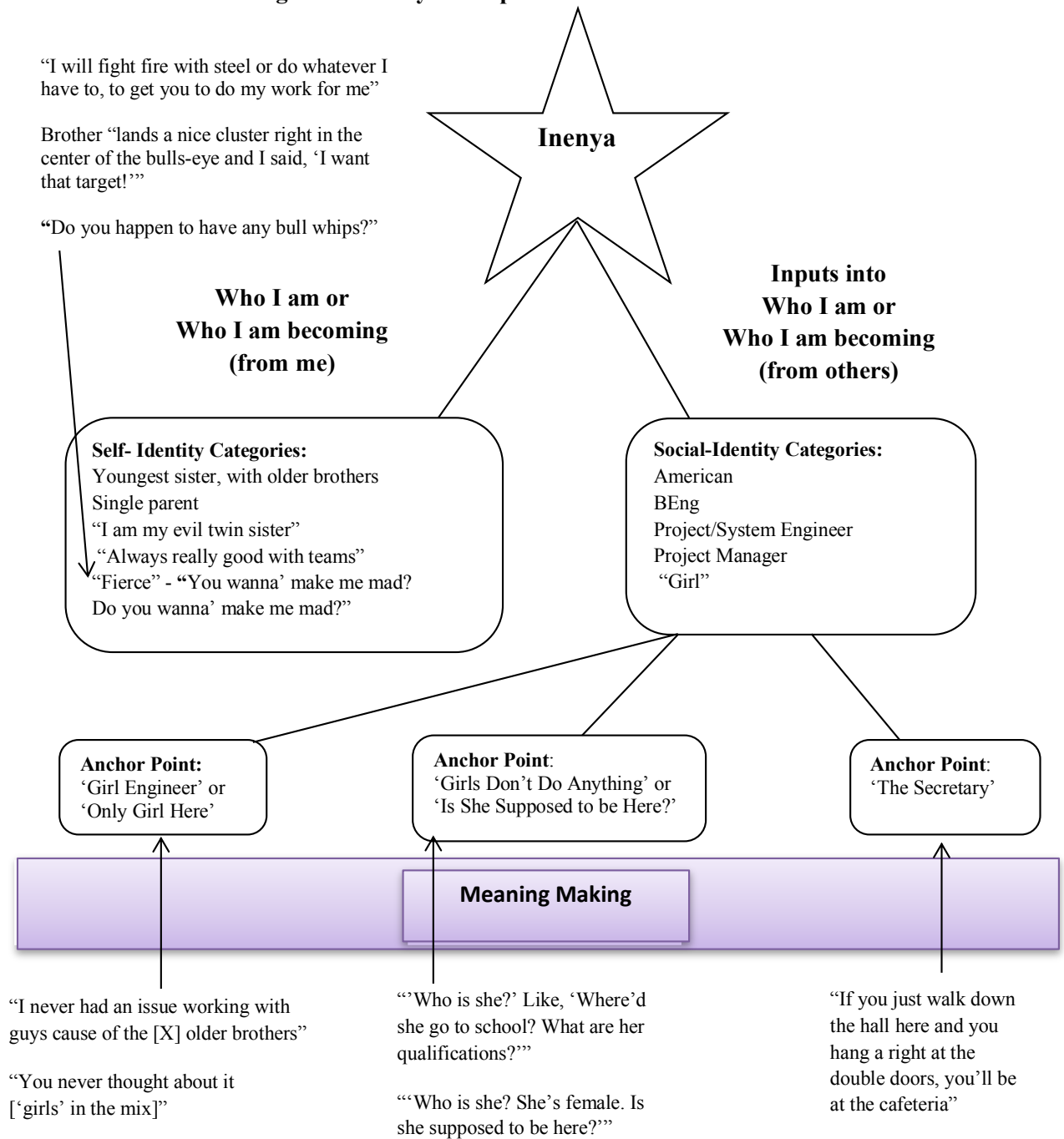
I never ended up doing a PhD. I think I'll always regret it, but that's what it is. I'm the one who thinks: "Crap, I've screwed this up, I should have...". I should have. It's sure that at [specific Company], it's an environment in which I've... I've been criticized for not having a PhD and I find that this fact was frequently used to belittle me, rather than focusing on "here's what you bring". No, it was always "Well, you don't have a PhD". I was sort of stuck, in my group, between "You don't have a PhD" and "You are only a woman".

Vigrine would often refer to 'her dog' in her interview with me, leaving me with the image of her being helpless in the face of this attributed anchor point. Her 'dog had died' metaphor left me with the impression that she was no more; she no longer had a will to continue. Perhaps I should have assigned this as a self-identity to Vigrine, but part of me refuses to believe that this is who she is. She is so much better than this 'dog on a leash'! So, while she may not be able to resist this anchor point, I will resist it for her.

Inenya

The final participant to be presented is Inenya. She worked within a public Canadian space organization. Her discourses also revealed much of ‘who I am’ and ‘who I am becoming’. Inenya’s map of identities is represented below.

Figure 12: Inenya’s Map of Identities



Inenya's sense of 'who I am' was clearly stated and repeated in a number of stories she shared with me. She embraced her sense of humour as a self-identity, where no other participant in this study had done so. Some examples of her sense of humour are shared in the text box above her self-identities. She also self-identified as being 'fierce', an identity that I found permeated discourses within this industry when someone was talking about STEM-professional women. In other words, when someone was talking about these STEM-professional women in, for example, emails announcing departures of STEM-professional women, or emails referring to these women who were closing acting appointments, being 'fierce' found itself in the narratives that described these women. Interestingly, her stories and narratives surrounding her self-identity also had elements of the masculine ideal:

My brother is in Texas, right? One of my brothers collects guns. He likes guns, and he started out collecting all – he started out wanting a gun from every war. So, he started – [he collected] anything: Korean, Vietnam, civil war... So, he gets up there with this thing and he just, you know, lands a nice cluster right in the center of the bulls-eye and I said, "I want that target!" So, he's playing it off that it's by me.....at like 1500 metres. You know, 1500 m, and when I got back to work, I stuck it up on my wall. And I was like, "You wanna' make me mad? Do you wanna' make me mad?"

I was telling them [Inenya's brothers] all the problems that I had. I said, "What I need is a whip." So of course, in Houston, you've got the Cavendish, I think it is, boots. You can go get your custom-made boots and they've got saddles and everything. And we walked in there and they said, "Oh, you know, can I help you?" I'm with my two brothers and one of their friends. These big guys. Big, big guys. I said, "Yes, do you happen to have any bull whips?" "Oh yeah!" And he comes back and he shows me and said, "You know, we got these and this," and I say, "Well what's that one?" "[That's] a nice hand-tooled, eight-foot leather spool." And I said, "That's the one I want!" So, I still have the bull whip. So, I brought it into work and I had that hanging on my wall for a while too. And I told all the guys at work it was for [Company X], and I told the [Company rep] it was for the guys at work! I actually brought it in to a contract negotiation once. At the beginning, I got myself all set up and I pulled out the whip and just stuck it there.

What I also found interesting in her interview was that at no time did she self-identify as a ‘mother’, even though she has two children and she shared numerous stories about trying to achieve balance between work and family responsibilities. She did, however, self-identify as a single parent - a cisgender-less discursive self-identity.

Inenya’s social-identities mostly encompassed her STEM-educational background and her various STEM- occupational roles. These STEM social-identities were interdependent with her ‘girl’-ness, I found, and were put into evidence by such narratives as “*they [men] all get together. I’d bring in muffins and stuff [for them]*”. She also made numerous references to ‘girl engineers’:

When I started working there were girl engineers in the ‘80s. I always had a team that when I first started, I was on a test team. And it was a mix. There were a couple girls, not a lot, but a couple [of] girls. But you never thought about it. It just wasn’t... it wasn’t an issue. It wasn’t even a comment.

Interestingly, she was the only study participant who referred to ‘women’ in her discourses. However, she did so when addressing ‘women’ astronauts, and not in reference to her or engineers:

We supported a lot of training and then the engineers would get on and make their modifications usually during their third shift so we would support them in bringing up the system and bringing it down and all of that. It was fun. It had some fun moments. We were working with the astronauts. And again, I mean that was the time [mid-1980’s] of Sally Wright and Judy Resnick and so there were always strong women in that whole environment.

With respect to her use of technical jargon - hinted at in the above story about NASA shifts on console - she shared a number of stories that reflected her extensive knowledge across the many technical fields she worked in. She matched my expectations for a highly knowledgeable individual working in this industry.

Moving to her anchor points, after applying the analysis framework, I found three attributed anchor points in her discourses: ‘The Secretary’, the ‘Only Girl Here’, and the ‘Girls Don’t Do Anything’/‘Is She Supposed to be Here?’. Inenya’s ‘The Secretary’ anchor point is similar to my own anchor point presented in my act of reflexivity in

Figure 2:

So, this guy came over and just, you know, it was, “Can you make copies for me?” or “Can you get me a coffee? Can you...” you know, those sorts of things. Seriously...and I’m his equal on this proposal. I’m the one that’s working the technical side from our side...coming up with the costs and the tasks and everything. And my former leader was working with me on one thing and this guy came in and was asking about coffee. And I looked at him and I said, “If you just walk down the hall here and you hang a right at the double doors, you’ll be at the cafeteria.” And then I turned around and I continued working and as he kind of just shuffled off or whatever...And he would ask me, “Are we meeting with the director for the proposal?” Or he would ask me, “Can we get copies made?” and again I would look at him very seriously and be like, “If you walk down this hallway and you take a left, you will see the photocopy machine.” Just... he was horrible! He was horrible!

As for the ‘Only Girl Here’ anchor point, Inenya recounted to me how she was given this anchor point at the beginning of her career. She told me that she had never really noticed if she was the ‘Only Girl Here’, as shown in her discourse surrounding her ‘girl’ social-identity. As far as Inenya was concerned, this was a time when Sally Wright and Judy Resnick, the first two ‘official’ women NASA shuttle astronauts, were symbols for all women. This state of being overshadowed her status as the ‘Only Girl Here’, she rationalized. When she did eventually open her eyes and look around, she would “...sit there and you look up there... ..and it’s all white men”. These White STEM-professional men attempted to include Inenya. These attempts underscored, I found, her initial lack of awareness of her ‘Only Girl Here’ identity:

[One of the guy’s said]: ‘Let’s not get into a pissing contest’. And it just hit me one time when we were talking when he was saying that and I said, “Umm, unless you’re

talking duration, then I can't participate." So, every time after that, [a male colleague] would say: "Let's not get into a contest that [Inenya] can't participate in." And it would just like [be] silence around the table and everybody's like: "She's right. She can't participate in that one!"

This masculine 'pissing contest' discourse, which was, and continues to be, common in my own experience within this industry, was rather graphic with respect to her 'Only Girl Here' anchor point. On the one hand, her male colleagues wanted to ensure her inclusion, and would strive to find other 'contests' that wouldn't need specific 'hardware' such that she could participate. On the other hand, the repeated use of this type of discourse, and her male colleagues' unawareness that she could not participate in such a contest, highlights that Inenya was accepted within the male domain, seen as an equal 'man' even though she was clearly a woman.

The final anchor point, 'Girls Don't Do Anything'/'Is She Supposed to be Here?', was attributed by several men to Inenya. It can best be described as a call to her credentials in 'doing space' and that she was a 'female':

"Who's this person?" "This is [Inenya]. [Inenya's] going to be taking over. [Inenya's] got a lot of experience blah, blah, blah." He was like, "Who is she?" like, "Where'd she go to school? What are her qualifications? What's..." and I had walked in like a minute or so late... So, he's going on and on and just like ripping me to shreds without even knowing me. And then finally my supervisor at the time said, "Um, she just entered the room." And so he shut up. And it was like, "Ahhhh...." really criticising me. And I thought, "Do they do this for everybody?" I didn't know. And then [I] realized later it was kind of his prejudices. He was also [from] a conservative European viewpoint but of the negative side in that "girls don't do anything".

As the story around this anchor point unfolded, this was the point where Inenya needed the arrival of her 'evil twin', a self-identity symbolizing an example of her resistance discourses that she used in this industry. She devised a curriculum vitae (CV) based on

her ‘evil twin’, passing this CV around at a meeting where this one man who had earlier attributed this anchor point to her was present:

[I decided that] I would introduce myself to them and I wrote a mock CV but I wrote it as a joke. I wrote that, you know, my name was [Inenya’s]. My alias, or my evil twin sister, was [Ayneni]. I was born and raised in Houston, Texas. I speak Frennish. The reasons why I came to [specific location] and I had listed five reasons. One was that the air traffic controllers were on strike and I got stranded in [specific location]. Another one was I was part of the North Pole Expeditionary group and they determined the North Pole was actually at [specific location] and... I can’t remember all the things that I said, but I had like this list of things and when we came into the room, I didn’t make a big deal about it, but I had it in my folder and I happened to sit next to the director...and I said, “You know, I just realized that you guys don’t know who I am. You didn’t see me the last time around on the spot check so I just wanted to introduce myself a little bit.” And I just like slid the CV over to the director. And he’s this older gentleman and he’s looking at this and then he just starts chuckling and he just slides it across so it goes around the table, and that was all that was ever said about it.

These social interactions, in Inenya’s day-to-day, demonstrate the extent of the cisgender influences that she faced. How this STEM-professional woman and the men who surround her work together in this industry, and how her identities are shaped, in mundane discourses are reflective of the power-relations that this woman must navigate in a variety of work-related activities. Notably, Inenya repeatedly reverted to masculinist discourses, and practices, to resist some of these attributed anchor points.

Summary of Range of Anchor Points

This chapter presented a range of anchor points for the six STEM-professional women who work in the Canadian space industry. In the table below, I provide a summary of this range as a way to provide a concise answer to (RQ1). This summary is

organized via the career stage of the participants, then the individual participant, and finally the range of her anchor points.

Table 4: Summary of Range of Anchor Points

Career Stage	Participant	Range of Anchor Points
Early Career (under 5 years)	Geirit	‘The Bitch’ ‘Females are More Serious’ ‘The Leader’
	Eliya	‘Not Very Serious’ or ‘You’re so Funny’ ‘Elite’ ‘The Only Girl’
Mid-Career (over 5 years but under 15 years)	Arwyn	‘Control Engineer’ ‘Time to Move On’ ‘You are a [lower level] ENG and you travel?!’
Late Career (over 15 years)	Desrit	‘Leader of Harem’ ‘You are the Only One’ ‘The Mommy’
	Vigrine	‘On Probation’ ‘You’re like a dog...you need to be kept on a leash’ ‘You don’t have a PhD and you’re an ‘old’ woman, you are worthless’ ‘How can we count on you? You’re a woman, you have kids’
	Inenya	‘Girl Engineer’/‘Only Girl Here’ ‘Girls Don’t Do Anything’/ ‘Is She Supposed to be Here?’ ‘The Secretary’

The next chapter will present the results of the analysis focused on forms of context. This will then showcase the range of anchor points, and their relationship with rules, meta-rules, and formative contexts.

Chapter 7: Relationship between Anchor Points and Organizational Rules, Meta-Rules and Social Values

This chapter, the second of three that presents the results of the analysis of the interview data, focuses specifically on forms of context. That is, I consider the relationship between the STEM-professional women's range of anchor points and the context within which she operates. The reader is reminded that context in this work is defined as being made up of organizational rules and meta-rules (Mills & Murgatroyd, 1991). In addition, context includes social values or, as Unger (Unger, 1987b, 1987a) called them, formative contexts. This chapter lays out my answer to the first part of RQ2, building on the previous chapter's introduction of the six STEM professional women: what is the relationship between selected anchor points and structural (e.g., organizational rules, formative contexts) processes? To maintain consistency across the chapters, I continue to group these women by their respective work experience, designating them as either early, middle, or late in their career, to answer this question.

This chapter marks the integration of the cell of influences, introduced in Chapter Four, for each of the STEM-professional women who are part of this study. These cells of influences involve the presentation of analysis of the STEM-professional men's discourses in concert with those of the STEM-professional women's discourses focused on rules, meta-rules, and formative contexts. The cisgender men's discourses were used to triangulate the stories and the narratives of the STEM-professional women. These discourses were also used to ensure integration of STEM-professional women and men in this analysis. In other words, the STEM-professional women's discourses and their lived

reality were studied within the complex, political social world of their respective space organizations which includes men.

I begin this chapter by presenting some general observations and findings, as I did in Chapter Six. I follow with a presentation of each STEM-professional woman's forms of context. The chapter closes with a table summarizing the found meta-rules, rules, and formative contexts, and their relationship to each participant's specific anchor points.

Canadian Space Industry: Observations and findings across all participants

In Chapter Two and Five, I presented certain aspects of the global and Canadian space industry, showcasing some of the knowledge acquired to date within the context of meta-rules, rules, and social values. Recall that meta-rules are system-wide rules, such as legislation or policies, rules are social constructions that determine how 'things get done', and formative contexts are, simply stated, social values. The literature review provides a high-level framework of comparison against which the participants' discourses can be studied. Working within the CSM analysis framework, the participants' discourses, focused on meta-rules, rules, and formative contexts, can also be studied beyond the understanding gleaned from the literature review. This approach then showcases the participants' understanding of the context of the Canadian space industry while also acknowledging the knowledge acquired so far in previous studies.

Within the framework of the literature review, I did find that all the STEM-professional women and men directly experienced cancelled space projects and/or programs. This meta-rule, namely that cancelled programs overshadow the conduct of business in this industry, was in line with Allan's (2004) findings. All participants voiced

their uncertainties and frustrations, in some cases in great detail, when it came to recounting cancelled projects/missions/programs. As for the participants' resilience, mirroring Lang et al.'s (1999) findings, one participant in particular, Vigrine, was in tears during her interview, as she recounted the constant uncertainties through the ever-changing positions, and projects she held or led. Her discourses were peppered with repeated defeat, calling upon her 'You are a Dog' anchor point throughout. Another participant, Geirit, incorporated the cancelled program meta-rule into her self-identity 'Need for Change', underscoring how she navigated being resilient. No cisgender specific ordering was found with respect to this cancelled program meta-rule; that is, both STEM-professional women and men reflected that they had experienced cancelled programs. With respect to the resilient meta-rule, as the STEM-professional men's discourses were not analysed to showcase their identities, it is not possible to identify a relationship between this meta-rule and the men's identities.

As for the meta-rule of working interdependently, as found in the literature (Kanas et al., 2000; Kanas, 2006; Lozano & Wond, 2000; Sandal & Manzey, 2009; Tomi et al., 2012), all participants reflected this meta-rule in their discourses. The STEM-professional women's discourses were, in general, focused on the cisgender relationships rather than on cultural specific issues such as language, humor, time-zones, etc. This could be as a result of the informed consent form they signed, which influenced their story telling, or my direct line of questioning. I could find only a limited relationship between Lozano and Wond's (2000) fourteen cultural factors, that affect the interdependence aspect of global space exploration initiatives, and anchor points. Specifically, humor with respect to a 'pissing contest', found in Inenya's discourses, was noted, but she related this to her

cisgender, and her lacking the necessary ‘hardware’ to participate in such a ‘contest’. Lozano and Wond’s (2000) specific findings related to cisgender and the interdependence of roles in space were also reflected by all participants in this study. Given how pervasive cisgender issues were, and given the NASA masculine ideal found in the literature (Maier, 1997; Schwartz, 1987, 1989), these cisgender rules are broken down in further detail in each of the six STEM-professional women’s discourses, to be presented in the following sections.

With respect to the demographic meta-rule in the Canadian space industry, namely that the White-engineering men are the managers/executives while the STEM-professional women are relegated to supportive, administrative roles, one particular public organization’s hiring rules was repeated across all the participants who worked in the public domain. The group hiring process, used by this public organization, reflected what many of these participants called the ‘inhuman’ interview rule. This group hiring process could take a year to complete, would involve extensive psychological testing, and involve minimal human contact between the interviewee and the interview board. Inenya, notably, had to complete the process while she and her children were suffering from a particular virulent flu pandemic. There are other aspects to this rule, and these will be shared within the individual’s discourses. I raise this meta-rule and rule, at this point, since there is an interesting contrast between this ‘inhuman’ interview rule, and private Canadian space organizations. Notably, Desrit’s and Eliya’s hiring experiences were based, in part, on the use of a trust rule, and trust social value. This notion of embracing trust in hiring processes stands in stark contrast to Arwyn’s, Vigrine’s, and Inenya’s experiences.

With these findings and observations in mind, I now present the results of the CSM analysis focused on foregrounding the meta-rules, rules, and formative contexts of the Canadian space industry. The presentation of the results of the analysis also considers the relationship of these meta-rules, rules, and formative contexts with the range of anchor points of each STEM-professional woman.

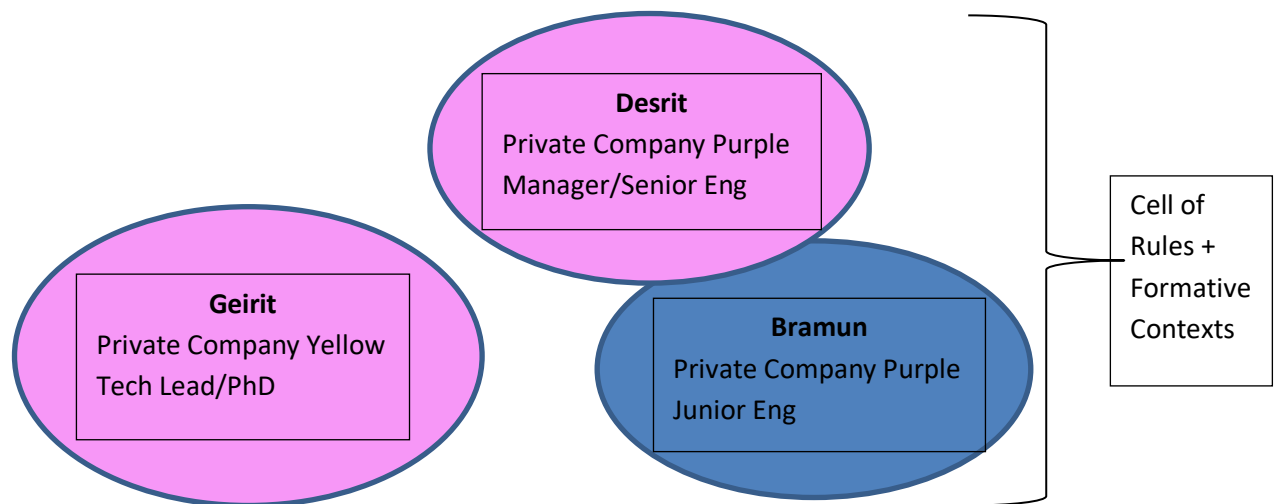
Early Career

Geirit

The map of Geirit's identities, presented in Figure 7, reflects a plausible story of her intersecting identities. She is a 'female', who is a 'PhD', who embraces her 'take it or leave it', and her 'long-term single' self-identities. She is also unsure of assuming the social constructions of 'The Bitch' anchor point while wanting to be recognized as 'The Leader'. She also considers her attributed 'Females are More Serious' anchor point to be counter to her merit and skills, as reflected in her social-identities of being a 'Research Assistant', and a 'PhD'.

Geirit's three anchor points and their relationship with organizational rules and formative contexts require an understanding of what her cell of influence is, and what this cell implies. The Canadian space industry sees a high level of interaction among various companies, and this interaction is on a daily, face-to-face³⁷ basis. It is plausible then that a cell of influences can cross a structural, hierarchal line. Geirit's cell, represented in Figure 13 below, is comprised of her social reality within Company Yellow, and that of Desrit and Bramun, who are employed in Company Purple.

³⁷ There are also virtual team interactions in this industry. However, none of the participants spoke to me about virtual teams in their daily work interactions.

Figure 13: Geirit's Cell of Influence

Geirit and Desrit, both STEM-professional women, are represented in the cisgender pink; while Bramun, a STEM-professional man, is represented in the cisgender blue. Positions/roles, and achieved education, are also identified for each individual for quick reference. For detailed identity-driven information about each participant, please refer back to Table 3, and to the map of identities for each STEM-professional woman. Distance between Geirit's circle and Desrit-Bramun circles represent the two separate companies, and the close proximity with which they work together. In other words, since Desrit and Bramun work for the same company and are in a hierarchical, functional system of reporting, their circles overlap and touch. Geirit works in a different company than Desrit or Bramun, but she does work closely with them on a day-to-day basis; so, the circles don't touch but are close. The complete cell of influence reflects social interactions among these three individuals.

The rules, meta-rules, and formative contexts found within Geirit's discourses are broken out into three areas of concern: the cancelled program nature of this industry; the demographics of Geirit's experiences; and, the naming of space structures. The social

reality of program changes, and the accompanying layoffs, permeated Geirit's discourses throughout her interview. As I highlighted in the previous section, my findings mirror the literature with respect to the ever-changing nature of this industry. The following two passages, taken from the interview transcripts in different stories, transcribed pages apart, speak to this program changes/cancelled meta-rule:

[Company Yellow] recently bought out [a specific private company]. Over the past six years there's been a couple [of] restructurings... Since the sale, there's been, you know, upper management of course moved on. There were a few layoffs... everything's sort of getting shifted around, but it's still in flux. But I'm now on my third [functional] manager since I got hired...

As far as program managers, ours got laid off two weeks ago and I'm trying to think of who is left. I think there's like two or three left, and they're all guys... He was, you know, so close to the end of the program and [they] got rid of him for the... because I think they saw that after the end of this program they don't have any big projects... Nearly every year there's been several layoffs. Like, it's been brutal. So, yeah, there's a bit of a fear of there's not going to be enough work.

Another important aspect within these two stories, beyond Geirit's acknowledgement of this meta-rule, is the demarcation between functional management and program management. This functional vs programmatic management meta-rule falls within the second area of concern, demographics of this industry. Geirit shared what this meta-rule is from her perspective:

We have a structure where we have functional management, so that's what I'm referring to when I say "my manager" but then there's also program manager. So, the functional manager would identify who was available for the different programs, and the program managers identify what they need for the program. So, it is, you know, more than one person who decides who's on what program.

With respect to the functional management sphere within Geirit's Company Yellow, the demographic representation of women followed what Geirit called the 'standard' rule of 20%:

There is one functional manager for software who is a female. The other managers are all male. It's your pretty standard 20% of the personnel is female.

This 20% rule was also reproduced in Bramun's and Desrit's discourses, in their own Company Purple and in what they had seen of other space companies. In the specific area of STEM education for aerospace, this particular 20% rule was also reproduced in Bramun's discourses:

Interviewer: *In your class, your graduating class, were there any women?*

Bramun: *The electrical – there was three streams in aerospace at [specific university] at the time. There's a fourth one now. Stream A was me – [specific] design. B was the propulsion group. And then C was electrical. The one with the most – I think the propulsion group had less, and the electrical group had more but it was never a huge amount. It was maybe... at most 20%.*

As for formative contexts within this demographic area of concern, stories focused on the 'old boys club' permeated the discourses of everyone in this cell of influence:

Bramun: *The technicians ... it's definitely an old boys club on that one. There's some – and even amongst themselves, too, there's some... let's say "behavioural modifications" that we're trying to work on... But, you know, some of the old habits... it's – Yeah. Working on the technician's side it's been all guys. We had... [a specific woman who] was there for one point. But she had a good personality for that because she fought back. But she... I don't know. If there was a girl in that group, I would've felt probably uncomfortable. Comments, yeah... some attitudes too, in general. You know, they just did the "Why is she here?" kind of thing...*

This particular passage highlights three social values that are part and parcel of this 'old boys club' formative context. Notably, that the men need 'behavioural modifications', that women are expected to 'fight back' in order to work in this environment, and that women's presence in a technical field would invariably result in questions as to 'why is she here?'. In addition, as the next passage highlights, the use of pornography in the workplace 'to kill time', which was a practice embraced by certain men in this 'old boys club', speak to both pornography being a social value, and the acceptance of the use of pornography in the work place, as another social value:

Interviewer: *You're reminding me of something. Yeah, there was – I think he was a technician... got let go. Because he was watching porn...*

Bramun: *Oh, [specific name].*

Interviewer: *Is this something that's commonly done, to your knowledge?*

Bramun: *I would say maybe in the early days, back in the – when the internet was new. It was... wouldn't've been surprised 'cause the guys were... let's face it, the guys were on the overnight with nothing to do... for a good six hours. They had a good six hours of [nothing] to do. And it wouldn't surprise me if it happened then. Now it would surprise me if it happens. Now I'd be very surprised if it happened. Even with the people that were there before...I would find it very surprising.*

Interviewer: *Yeah? Why?*

Bramun: *...Just umm...*

Interviewer: *They've been talked to or...?*

Bramun: *Well not talked [to] – I think it's just... they've evolved. No, well to be brutally honest, they've evolved with the times. It's... what used to be acceptable is no longer acceptable when it's been shown and can't...you know, the downtime and all that stuff. There's probably less of it now, too. But they're definitely more... disciplined? I think that's the right word.*

Interviewer: *Yeah...and it's a different dynamic because at the beginning it was just you guys...*

Bramun: *Yeah.*

Interviewer: *And I remember we'd have movie nights...*

Bramun: *Yep...it was in the [specific location].*

Interviewer: *I mean they were [some] fine movies, it was just to kill the time...*

Bramun: *But yeah, the old [pornography movies]... Now we can't. We've got [too much to do] and...There's just, you know... "Okay, how about an hour break...". In the middle of the night, it's... But sometimes there's still the occasional one guy alone at night now...but again, if that happened right now, I'd be surprised. I don't know if... I don't think it happens, but... I'd be surprised if it does.*

Interviewer: *Do you think the firing of [specific name] would've had an effect?*

***Bramun:** I think he was still the exception. I think it definitely did. I think there was an earlier incident where somebody basically... had a beef with another employee and they sent them an email and they can't do that. They can't... they can't... they can't do that. They did it... and they were a contractor back there. They worked for [specific company] at the time. That would've been another one that... he would not have surprised me if he did stuff like that. But had to [be let] go for different reasons and that. And I think that was the first level of discipline that came in... And then when [specific man] became the supervisor... that was the beginning of the, "Okay... You're not at school anymore. This is serious work. You gotta get down." And then that guy was – I don't... he just, I guess he just wouldn't learn when changes happened. So... I know they tried to put him on probation. And then the [specific organization] just basically went, "No. One strike you're out." Which probably, overall, is probably the best decision 'cause it made it clear to everybody it's... There's no chances here. Just be smart here.*

I've reproduced this lengthy passage in its entirety as it demonstrates not only the social values associated with pornography in this industry, and in school, but also that clearly Bramun felt uncomfortable talking to me, a STEM-professional woman, about this. Until this interview, I had never asked anyone about this social value directly; Bramun knew also that he could not deny its existence with me, given my position in this industry, and my knowledge of such practices. While Bramun tries to reassure me that things have changed, that the men have 'evolved', and this use of pornography in the workplace was when 'the internet was new', the individual we are referring to was fired two years ago. As emotionally charged as this interchange was between us, in retrospect, I believe it was important to bring this social value to light here.

The third and final area of concern, the naming of space structures, came to light after I and my co-authors conducted an archival study on the mid-Cold War era and space exploration (Ruel et al., 2017). In this study, we found that individuals involved in Pan American's Guided Missile Range Division (GMRD) would assign the feminine to various space structures. All three individuals in Geirit's cell of influence reproduced this

cisgender structures rule. One example, from Bramun, embraced the masculine cisgender structures:

***Bramun:** And then after graduation I applied to... all the aerospace companies. The big boys: the Bombardiers, the Spars... and then there was MDA and all that...*

While this particular story is not as obvious as those found in the archival study on the GMRD, I recognize that, by embracing cisgender structures, Bramun is telling a tale of man, the ‘big boys’, controlling his environment. When this tale of man controlling his environment is put together with the previous story on pornographic movies in the workplace, there is an important masculine social value that is surfaced. Notably, that man must control objects that includes space structures and women.

There were important tensions between Geirit anchor points, specifically ‘The Leader’, ‘The Bitch’, and ‘Females are More Serious’, and rules and formative contexts that she shared. While Geirit was aware of the constant programmatic changes (a meta-rule) in her company, she tried in a number of settings to assume the attributed anchor point of ‘The Leader’. In spite of the risks associated with working in an unstable project world and in spite of the attributed cisgender inherent in ‘The Bitch’ anchor point, she continued to push and/or to resist the day-to-day interactions that attempted to, in her words, ‘put her in her place’. She shared a number of different stories and narratives, spread out throughout the interview, that highlight this relationship:

There’s another guy in that program that just retired actually. He had like 40 years of experience in the space industry, so he knows a lot, has a lot of experience and he would sometimes talk like: “We’re going to do this,” and there were a couple of times where I had to be like, “You know, I appreciate your input but we haven’t decided yet and even that’s not really your decision to make, but, you know, don’t stop giving me an input, but that’s not your... you know, I’m leading the program.”

I do have annual performance reviews and sometimes these sorts of things [overstepping my bounds, being ‘The Bitch’] come up.

I was thinking of a specific instance where I had basically said to this guy: “Thank you, but that’s not your role”. In front of a room full of people! And then I went and asked my functional manager if that was overstepping my bounds because, you know: a) outside perspective; and, b) somebody with more experience than me, my senior.

These examples are also indicative of resistance discourses she used in her day-to-day social interactions. In the first passage, with a male colleague who was well beyond her years of experience, she did not hesitate to stand her ground as the attributed ‘Leader’ of the program. In addition, Geirit’s focus on her merit and skills, during the interview, appears to be another way for her to navigate embracing ‘The Leader’ anchor point and to shun ‘The Bitch’ anchor point.

There are any number of possible interpretations to Geirit’s resistance discourses. Turning to the literature, I could argue that Geirit had not developed a sense of NOT belonging in this male-dominated industry, and so did not experience low self-confidence (Etzkowitz et al., 2000). It is also plausible to argue that she was conforming to the dominant culture in order to survive, embracing the attributed ‘The Leader’ anchor point such that she could “walk a very fine line between being ‘like’ the valued-masculine prototype” (Miller, 2004, p. 68). I cannot ignore, however, that she did share with me that she struggles with ‘The Bitch’ anchor point. Typically, women who try to lead are labelled ‘The Bitch’ (Mavin, 2008). While I could not find any evidence that she was indeed being ‘The Bitch’, Geirit was assertive, knowledgeable in her field, and had been assigned programmatic responsibilities in her various missions. The literature suggests, with respect to her cisgender ‘The Bitch’ struggles, that she might be “avoid(ing) any implication that they were not ‘real women’” (Miller, 2004, p. 68). What was clear was that she is navigating a cisgender fine-line in this relationship between her anchor points and meta-rules, rules, and formative contexts: being part of the ‘old boys club’, by being

‘The Leader’, while also wondering about her feminine side, characterized in this milieu as ‘The Bitch’.

Some may argue that a level of indoctrination into the masculine-norms and walking the cisgender fine-line may have occurred through Geirit’s extensive educational studies. The purpose of this study is not to look for the origin of the relationship between anchor points and meta-rules, rules, and formative context. The relationship between Geirit’s two anchor points and her social reality in this industry underscore that the presence of meta-rules and rules (program changes and accompanying layoffs rule, program management and functional management rule, ‘standard’ rule of 20%, cisgender structures) and of formative contexts (‘old boys club,’ “behavioural modifications”, fighting back, “Why is she here?”, pornography in the workplace, controlling objects) require her to navigate not only her technical know-how, and her abilities, but also that she is positioned. This positioning, as the cisgender Other, is present even in the early career of a STEM-professional woman.

Eliya

Eliya’s map of identities reveals her intersecting self- and social-identities, and her range of attributed anchor points, as did Geirit’s. In Eliya’s discourses, I found that she is a ‘girl’ who embraces her feminine attributes, and her STEM accreditations and STEM-experiences, while navigating being ‘The Only Girl’, and finding herself among the ‘Elite’, and ‘Not Very Serious’/‘You’re so Funny’. Her cell of influences is the same cell as that of Geirit’s, presented previously in Figure 13, with Desrit and Bramun. The difference between Geirit’s and Eliya’s cell of influences is that Eliya is employed by Company Green, while Geirit works for Company Yellow.

Eliya's discourses and their analysis put into evidence three areas of concern with respect to the forms of context: Eliya's international education; the STEM interview process; and, the STEM demographic reality. Beginning with her education, Eliya defined the European college system as more of a preparatory system for university studies with many references to its 'elite' value. In other words, the European STEM education she received is both a rule and a social value:

Very elite...It's a bit like CEGEP³⁸ preparatory, specialised in math and physics. And, at the end, there's a competition and depending on the results, the best go to the best schools, and the ones who didn't perform as well, go to schools that aren't quite as prestigious.

There's a stream you can take when you are good in math and physics, very elite. So, I applied to that; but it didn't work out. I guess I hadn't really understood the point of those schools; everyone wanted to go to a very prestigious school...

Eliya chose the STEM direction for her education, which she characterized as exclusive and tension-filled:

There's a specific branch for engineering, with a specialization in space and aeronautics. I chose this school in part because of the specialisation but also because it allowed me to do a double diploma, allowing me to do half my studies abroad, and end up with two diplomas.

I ended up with three ulcers, that was horrible. Otherwise, the other years went well; but, I worked really hard to be part of the double diploma. I had to be top five of 160. I really worked hard.

Eliya shared a number of stories about her education and her experiences in classes and during her internships. Specifically, she did notice that she was the only girl here, talking about her status as a rule and not just an attributed anchor point:

³⁸ The "Collège d'enseignement général et professionnel" or CEGEP system is a preparation educational system native to Quebec, Canada. It is equivalent to high school grades 12 and 13.

In the [specific location], there were classes where I was the only girl. Or we were two among 30.

In [Europe], internships are a mandatory part of engineering training and some are blue collar, where you really have to be doing manual labour, at the bottom of the ladder. My internship was making flooring for [specific company], and yeah I was pretty much the only girl, and there were so many times that, well the others were a bit rough around the edges.... Anyways, at lunch, I'd get corks thrown at me. One guy came to me and told me he was watching me all day... yeah, that was a bit... It wasn't long, just six weeks, but it still left an impression on me.

In [Europe], that's it, you come in and boys look at you from head to toe, they whistle at you, stuff like that. We sometimes had Italians who...and they had pulled that on [a female colleague], checking her out from head to toe!

These stories not only highlight the only girl here³⁹ rule but also an important social value: that women are targets for men's teasing, and that they are objects to be admired.

The second area of concern, the STEM interview process, focused on stories of Eliya's job interview experiences. These interviews, interestingly, were nowhere near as technically demanding as in other space organizations, such as in Arwyn's experience.

Eliya appeared to reflect in her discourses the need to be adaptable, as a rule and as a value:

They asked me questions that were pretty straight forward, not too technical either. It was more assessing my personality and [to] see if I would be adaptable.

[I was asked:] "What's going to set you apart from the other candidates?" So, I explained that I had been abroad and I had lived a multicultural experience. For me, that's very interesting because we see different approaches, and different ways of doing things, and I attribute a lot of value to that. He said: "We don't hire just anyone. Everyone has obviously spent years abroad"

³⁹ I chose to use the following convention for clarity: when referring to an anchor point, I capitalize the key words and put them in single quotes; rules are kept in lower case. This is done to avoid confusion between an anchor point, and rule or social value.

In the second passage, there are two calls to different rules and values; notably, she refers to adaptability in the face of multicultural experiences, and the job interviewer calls to the elite status of working in the space industry. In addition, the job interviewer appears to be putting Eliya in her place: she values seeing ‘different approaches’ while the job interviewer states that this is a norm, that ‘obviously’ everyone has lived abroad. The elite value continues to appear in other stories around the interview process, along with Eliya being put in her place as a norm:

***Eliya:** [My Supervisor] wanted to know if I would integrate well into the team...and if I'd be able to be autonomous and learn everything.*

***Interviewer:** So not too many technical questions during the interview?*

***Eliya:** No. [My Supervisor] said: “I could tell you were honest. When you didn't know something, you thought about and said what you could... Yeah, in Canada, don't you worry, if you don't do the work, we'll replace you and won't speak of you again.”*

The third area of concern, the STEM demographic reality of the space industry, Eliya talks to the need to maintain demographic balance as a rule:

[Supervisor] ended up with some girls [she laughs]. No, there are... there's [girl #1], [girl #2], [girl #3] and there's [girl #4] in [a specific program]. No, really the team isn't bad, yeah. There are [specific number] of us total, and, yeah, there are more boys, but there are four girls.

There were never any conflicts, everyone worked well together. Strengths and weaknesses were recognized and it was great. [But] at the moment there are lots of people leaving. I understand now [Supervisor], in my interview, his main priority was to be sure to maintain balance in the team, and I get it, it can go wrong very quickly, and you can feel it...

In spite of what she perceived her supervisor's attempts at maintaining the demographic balance rule, Eliya did notice that the only girl here rule was repeated within this work environment:

Yeah, at [specific program], all my meetings are nearly all boys, by phone, or in person. [This specific program] doesn't have many girls.

With respect to Eliya's range of anchor points and their relationship to these rules and social values, I looked at all three of her anchor points; namely, 'Not Very Serious'/'You're so Funny', 'Elite', and 'The Only Girl'. The attributed anchor point, 'Not Very Serious'/'You're so Funny', has an important relationship with the cisgender rule of being put in your place, and the social value of being targets for men's teasing/to be admired. From an academic literature perspective, Powell, Bagilhole and Dainty (2009) found that within engineering professions, women perform their cisgender, in part, by accepting the cisgender jokes as a way to get by. The need to have a sense of humor, to be able to take the teasing and the physical admiration, are part of being in this industry if you are woman. At some point, you learn about the social value of adaptability, to this cisgender way of being. It is notable that Bramun's discourses reflected an interesting social construction of Eliya, where he clearly had respect for Eliya and her technical abilities, in spite of this anchor point of 'Not Very Serious', which he attributed to her as I did. Eliya manages to navigate a cisgender fine line, also, by embracing at times this attributed anchor point, as a way to fit in, and as a way to get by.

Focusing on the 'Elite' anchor point, there is clearly a relationship with the elite rules that Eliya experienced in her STEM education, and her work environment. The excelling rule, along with the elite value, played such a pivotal role on her, and on her identities, that this notion of elitism pervaded her discourses throughout the interview process as I presented above. The attributed 'Elite' anchor point, and Eliya's retention and application of the elite rule and value, push her 'to be the best'. Unfortunately, this perceived elitism

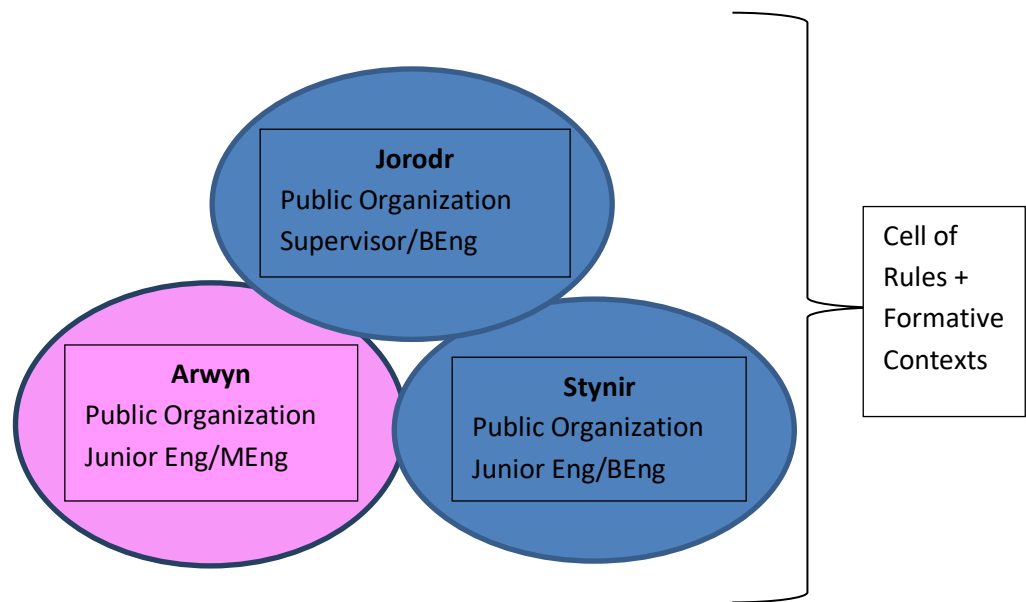
rule, value and attributed anchor point puts her health at risk, to the point of experience three ulcers.

As for the ‘The Only Girl’ anchor point, again clearly there is a relationship with the only girl here rule. This relationship is in spite of her direct supervisor’s attempts to embrace the demographic balance rule, as the environment outside of her work unit found her to be the only girl in meetings. There is also an important tension between this anchor point with the need to be adaptable. There is a responsibility, from Eliya’s perspective, to be aware of the need to conform as she embodies ‘The Only Girl’. From the literature, in particular Miller’s (2004) findings that women conform to the masculine culture, the power-relations that are working in her social interactions, and that are reflected in her storytelling, show that she is teased, and she can be characterized as an object for men. In other words, Eliya is aware of being ‘The Only Girl’ anchor point as a function of the only girl here rule, and the attempts to achieve the demographic balance rule.

Mid-Career

Arwyn

Arwyn’s map of identities highlights that she is a ‘girl’, mother and partner, who embraces her STEM accreditations but wants her ‘Control Engineer’ anchor point to be recognized as a ‘Lead’. She also navigates the ‘Time to Move On’ and the ‘You are a (lower level) ENG and you travel?!’ anchor points. Her cell of influences is made up of her direct supervisor, who is a man, and a STEM-professional male colleague who both participated in this study. Considering this partial work unit permitted me to surface her attributed anchor points, and their relationships with organizational rules and formative contexts. Her cell is represented in Figure 14.

Figure 14: Arwyn's Cell of Influence

My analysis of Arwyn's discourses revealed three areas of concern: the interview process; juggling her various STEM responsibilities and family responsibilities; and, her various role assignments. With respect to the interview process, Arwyn shared some of the differences she saw in the hiring rules since she started working at her company, that she deemed 'more human', to the more recent hiring practices of this same organization, that are based on pools of candidates:

Back then they didn't hire below [lower] Eng. I was [hired on] a two-year term. Yeah, defined two years, not permanent...I had been there two months, I wasn't sure whether to apply or not [to another job] and my [former] supervisor said yes: "If you have the opportunity, you take it". It took over a year to fill the position, but that's how I got my permanent position at [public organization]. That's where I became aware of discrepancies towards women in science and engineering...I don't know why it took so long...I was still an employee at that point, I was working in my temporary job, I figure it's something to do with Human Resources. It wasn't a completed process, not like nowadays, it was an interview with [former supervisor] and [female colleague], I did my English test, and that was that.

Jorodr shared his own experiences concerning being part of a pool of candidates, and the ‘inhuman’ pool hiring rules:

Jorodr: *[It was] very complex... Oh, there are some things I can't say because it's, you know, part of the process is you're not supposed to tell, but there was a test as part of that. Like a psychological evaluation and all this, so...it was like a half-day thing. So, it was a pretty intense selection...There's many steps to [the technical part] like it was... like a test but there was also a presentation, an assessment of material...then the presentation in front of a panel. And then a psychological evaluation separate from that. It was like [project] gates. I think I had two or three or if not four gates. But there were many gates and some of them were technical. Some of them were more an interview style where they ask you questions and there were questions that were technical and also like... supervision level. So, they were asking you... I remember questions like, "How would you manage a person if this and that [happened]?" to evaluate you're decision-making.*

Interviewer: *So, through the gates, was it the same people evaluating you at each gate? I'm going to call them the "interview team". Were those people involved at each gate? Or was it different people?*

Jorodr: *Most of them you couldn't really tell because you would hand in, or type your thing in a computer, and then you would be told: "Next session is in this room". And then you go in the other room. But the panel that I saw when I presented was the same people...I believe that evaluated the rest, I think.*

Interviewer: *And you had a personal evaluation with this panel?*

Jorodr: *A personal...? Yeah, yeah, yeah. Like an interview with questions. I think it was part of it. They did it in two parts. You present... then you would have a break, and come in, and they would like [have] questions and answer period with three people... but what I found the most hard... This extra psychological evaluation was another match... They got a lot of flak from a lot of candidates [that] didn't pass that gate. They said that was way too much for that position.*

Interviewer: *How long did that whole process take, do you remember? Roughly?*

Jorodr: *I know the whole process was super long. Like before you get – before I got [the] position where I am at now...I don't [know]...maybe a year?*

The ‘inhuman’ pool hiring rules, as Jorodr described them, involved extensive processes including psychological testing of all candidates. This ‘inhuman’ rule appears to include

a 'blind' component to it, whereby a candidate applying for the job in question does not seem to know who is on the hiring committee, and what this committee is evaluating. The problem in this assumed 'blind' hiring process, however, is that while the candidate has no visibility into who makes up the hiring committee or what their activities are, the hiring committee is very much aware of who the candidates are (for example, they know their names, have access to their resumes and their work experience, etc.). The committee also has access to psychological profiles of each candidate. While it may appear that this is bias-free hiring, the practices at this organization are indeed biased, but in which internal direction is not clear other than through the demographic results of such competitions; that is, White men are almost exclusively the ones hired into positions of management from these types of competitions.

As for the second area of concern, juggling work and family responsibilities, Arwyn's discourses focused on the need to multi-task across all of these responsibilities as a rule. Two separate stories, recreated below, attest to her juggling acts, and the stress involved with respect to this multi-tasking rule:

I was deployed 50-50 with the [particular] group and this was not acting, this was a deployment where the work was more in line with my [specific project] control expertise. Making models, stuff like that, and that was 50-50, while I was still taking care of my [other specific technical] tasks, something I pretty much never stopped doing. A bit later, I got a four-month interim, acting, with the same group working on [another project]. After that, I did [specific role] with [male supervisor] in [another technical area].

So, from one day to the next I ended up with a backlog of leave, like seven weeks banked, so I used them to go to the [child's specialist]. Because at first, I had agreed to work a bit more each day, and I was exhausted.... you start stressing out for every fifteen minutes you take, you don't dare leave a couple minutes early because you need this time.... But when this [her child's specific needs] happened, I decided I'd take the time for this.

Arwyn was also keenly aware of the cisgender presentism rules in her organization with respect to this need to multi-task. In the previous passage, she shared her anxiety over every 15 minutes she might need to take in a day, whether it was for a coffee break, a washroom break, or to talk to colleagues in the hallway. None of her male-colleagues in her cell of influence shared such concerns. Furthermore, in spite of her ability to multi-task, and her long hours both at work and at home, there appeared to be no value assigned to her ability to accomplish all of these tasks:

They [male colleagues] got plenty of, even internally, awards. I wasn't really recognized internally. Now, that's not what I work for, but those are the details. You know the Director's Award? I never got it. [Specific male colleague] got it! I'm a bit sad about never having received it.

This award-winning specific male colleague, who is not part of this study, represents a significant signpost with respect to the formative contexts at work in this organization. This specific individual was a married man, with grown children who no longer lived at home, who did not seek new challenges/opportunities for acting appointments or for any additional types of experience. He did not have any of the concerns that Arwyn had with respect to juggling family life with work life either. This specific male colleague spent most of his work time doing physical training, or 'disappearing' from the building, as confirmed by all those interviewed in this particular cell of influence. This specific male colleague was, simply said, the worst performing individual in the unit, and yet he received the coveted Director's Award, while Arwyn's multiple tasks and skills, including family-life responsibilities with a special needs child, were not valued or recognized. This inability to recognize her work/life efforts is captured within the cisgender award social value.

With respect to Arwyn's various role assignments, the third and final area of concern, she would take unwanted jobs to ensure she kept moving through her STEM profession:

I've already heard [Stynir] say in a meeting: "I don't do that". But, like, I did it for like seven years! Or when he said: "Oh that's so boring", well yeah! What do you expect? It's not...no one is going to give you a big award for it, but it's part of the job.

In addition to this cisgender taking unwanted jobs rule, Arwyn was either fighting for resources, as the first passage below shows, or she was being assigned specific roles, either by her direct supervisor, or she had to rely on her colleague to get 'flashy' assignments, as the second narrative exchange shows:

I negotiated with [specific male colleague], against [him]... That was something, negotiating against [him]. I had to pull all my aces out my sleeve, all the weaknesses of his that I knew. It wasn't nice, but I didn't have a choice. Yeah, well he was biased, he wanted the spot to do his own experiments and I told him: "If you don't give me the spot, it's because you want it, not because, you have no other reason, you just want it, not because...". So yeah, I'm pretty proud of myself, I won!

Arwyn: *I was chair of the meeting at [name of specific meeting] between [Europeans] and [Company Orange], and our group. All that...organizing and chairing the monthly meetings... So, I was given a good amount of responsibility. So those are really good experiences, and the fact is that those responsibilities were given to me. I certainly would have liked to have something a bit more flashy...*

Interviewer: *And you weren't given a choice [for this particular responsibility]?*

Arwyn: *No.*

Interviewer: *[Jorodr] assigned it?*

Arwyn: *That's it. I'd even say that [a specific responsibility] was the first, and it was [Stynir] who said "Well, we could give this one to [Arwyn]".*

Arwyn recognized that, at times, she needed to embrace the masculine, aggressive 'pulling all aces' values to get access to resources. She also recognized that she needed to acquiesce to her manager's wish for ordered assignment of responsibilities, a rule for her particular cell of influence that was confirmed in Jorodr's discourses. Similarly, Arwyn

let her male colleague speak up for her to get an assignment; thus, bending to a masculine ideal of ordered assignment rule.

In the analysis of Eliya's rules and social values, I touched on the role humor can play in social interactions in this industry. Arwyn's 'You are a [junior] ENG and you travel?!' anchor point also falls into this humor category relationship, and so won't be explored further. The remaining two anchor points, namely 'Control Engineer' and 'Time to Move On', are the subject of closer examination. The demoting 'Control Engineer', as opposed to 'Lead Engineer', is in tension with the cisgender hierarchy at work within the space industry. This tension imposes on her, at times, the need to be confrontational and, at other times, to acquiesce as she shared in several passages presented previously in this section. Hacker (1989) argued that military engineering provided the first instance of structured cisgender hierarchy, where the masculine ideal of pursuing challenge 'passionately' is coveted (Robinson & McIlwee, 1991). Mirroring these findings, Arwyn, in her attempts to resist this 'Control Engineer' anchor point, focuses her efforts on 'passionately' challenging access to services and technology that a male colleague is denying her. However, while conforming to a dominant masculine norm of passionately challenging, she also finds herself walking a cisgender fine line, embracing a more feminine approach when duties are being apportioned (Miller, 2004). Notably, she acquiesces, letting her male colleague(s) speak up for her. This confrontation vs acquiescent cisgender approach to navigating social relationships in this industry mirrors the early career participants' experiences. Similarly, I also learned to walk the masculine-feminine cisgender ideals, as I shared via one of my attributed anchor points, 'Not getting you coffee - Not the Wife-Secretary', presented in Figure 2. Furthermore, interestingly,

this ‘Control Engineer’ anchor point is also in a relationship with the ‘inhuman’ pool hiring rules. Arwyn was subject to extensive pool hiring processes, where every possible angle of her technical and personal suitability was tested. And yet, in spite of this ‘inhuman’ treatment, which in theory is in place to ensure she is the correct candidate for her position, she continues to be categorized as a ‘Control Engineer’ instead of the earned ‘Lead Engineer’.

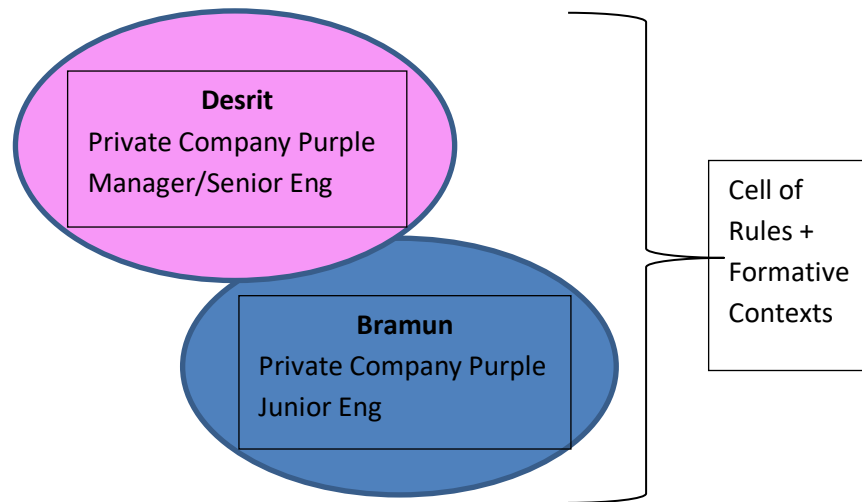
The ‘Time to Move On’ anchor point is in a tangled relationship with the rules and social values that Arwyn, Jorodr, and Stynir shared. The clearest way to untangle this relationship is to break them out into component parts. First, Arwyn goes above and beyond what she is ‘supposed’ to be doing as a STEM-professional. Arwyn clearly stated, and demonstrated, that she wants to move up the hierarchal chain of command, to eventually be a manager in the space industry, while also being a mother and a partner. In spite of doing all the things that she is doing, namely, getting extensive operational experience, mission experience, and travelling, and doing the unwanted jobs, she is told that it might be time for her to ‘move on’. Second, Arwyn does not receive awards for her performance, in spite of her abilities, experiences, and successes. STEM-professional women, as Jorgenson (2002) found, do adopt a variety of positions to support their ‘qualified professional’ identities. This positioning includes awards as a way to highlight their ‘acceptable’ nature within their profession. A male contemporary of hers receives an award for not performing. The tension between her ‘Time to Move On’ anchor point and this cisgender award winning value is inescapable: she was not deemed ‘acceptable’, and so it is plausible to argue that Arwyn not receiving any type of award for her service leads her to be open to the suggestion inherent in this attributed anchor point of ‘Time to

Move On'. Third, Arwyn is in the age group of STEM-professional women who tend to 'Move On' from their STEM-profession, as Hewlett et al. (2008) found. It is therefore also plausible to argue that Arwyn was open to this attributed anchor point, as so many other STEM-professional women have 'Moved On', perhaps for similar reasons. These tangled relationships among rules centered on cisgender taking unwanted jobs/ordered assignment of responsibilities, and formative contexts that assign no value to cisgender multi-tasking/awards highlights the intricate social interactions that can occur in identity formations. They also highlight how someone could possibly accept or resist these identity formations, including the role that cisgender plays.

Late Career

Desrit

Desrit's map of identities also captures her interdependent identities, showcasing her complexities: a 'female', mother, and partner, who embraces her STEM presence, even if she is 'The Only One'. Her role as a supervisor, via her cisgender 'The Mommy' and 'Leader of Harem' anchor points, are also important aspects of who she is and who she is becoming. Her particular cell of influences, consists of herself and one of her male employees, Bramun. This is presented in Figure 15. Note that I could have included Geirit or Eliya in this cell of influences; however, I found there were no additional insights to be gleaned from including them here for Desrit.

Figure 15: Desrit's Cell of Influence

There were three areas of concern that came to light following the application of the CSM framework to Bramun's and Desrit's discourses: Desrit's education; her first STEM position; and, the hiring values for Company Purple. Desrit's education is marked by her strengths in math, and physics. As a result of her strengths in these particular areas, a high school guidance counselor recommended that she consider going into engineering in university. She took this advice and found that among the one hundred students in her cohort, there were only four 'girls'. This cisgender stratification rule continues into today, as Desrit shared:

You see, thirty years later, my daughter's boyfriend just graduated in...engineering...and when I went to give him his ring⁴⁰, there were two girls out of 60 students in...engineering... it has not changed!

Eliya's discourses also highlighted this cisgender stratification rule. I chose in that previous analysis to mirror the 'The Only Girl' anchor point with the only girl here rule,

⁴⁰ The engineering ring ceremony is a solemn occasion, where an iron ring symbolizing the engineer's pride and humility when performing their professional duties is awarded.

as a way to guide the reader to an understanding of this social reality. In Desrit's analysis, I chose to move forward in my naming of this rule for what it is: cisgender stratification, influenced by certain convention including the military's presence in space. This can most clearly be seen with respect to Desrit's first STEM job. She worked within an aerospace private company that was focused on military/defense initiatives exclusively. Desrit found herself now in an entirely masculine environment, further highlighting this cisgender stratification rule beyond her university studies. This stratification was her 'normal' social reality now:

Well I've only ever been in masculine environments.... At [specific private company], apart from the secretaries, it was pretty much only boys. Many ex-military also, because there were radars, many systems that were related to the army. There were a lot of ex-military at [this private company].

This brief story also provides more clarity on this cisgender stratification rule.

Specifically, the feminine ideal was represented by secretaries who were all women.

Men, in particular, the military men, were the engineers doing the technical work while the women were relegated into administrative, support positions. This story also highlights not only the military's presence in space as a formative context, it also reflects male-dominated values that are bounded within the military.

With respect to the third area of concern, namely hiring practices at Company Purple, she shared some of this company's hiring rules:

Desrit: *Our contracts are posted as job descriptions online, so that's what we update with current info, like the number of [projects] we have. We recycle templates...*

Interviewer: *And there's always Employment Equity legislation?*

Desrit: *We've never been through that. We are really in a special position. When there's a human resources problem, there's no one [I] can turn to, they are at the other end of the world. The only way they can help is when [I] have found someone.*

[I] send their CV over, and a contract gets drawn up. [I] suggest a salary based on qualifications, and they approve.

The Company Purple hiring rules, as Desrit states, are in sharp contrast to those outlined in Arwyn ‘inhuman’ hiring processes. As Desrit sees it, the hiring processes for her company are imbued with trust: Company Purple’s Human Resources, who are ‘*at the other end of the world*’, trust Desrit’s capabilities as a supervisor to hire the person that she needs. Desrit’s own experience of being hired as a manager supports this idea of trust being part of the hiring rules and social values:

It was the logical choice, I had been there the longest, I had the most experience. There was no posting for my job. [I was] offered...the position. That may have been unfair to the others, but I never, it was never a bigger process. That’s the reality of my job...

As for the ability to hire women, or ethnic/raced individuals, Desrit finds that one outside environmental constraint is hampering her abilities to hire the right person for the job:

Interviewer: *Is there a proportion of the applicants that are women?*

Desrit: *It’s more masculine, absolutely. Lots of international CVs, and that’s tough for us because it’s important to us that our engineers be members of the Order of Engineers. It’s important to us that the people we hire be able to become members of the Order, and when they are international, it’s very complicated. Although we don’t limit ourselves to electrical engineering, there’s also mechanical engineering where there are few girls too.*

The ‘*reality of her job*’ is counter to what is found in the literature. Faulkner (2007), in particular, discounted that women could be promoted based on merit and skills alone.

Nowhere does Faulkner refer to trust as a rule or as a social value, however. It is plausible then that this rule and formative context permits a STEM-professional woman to be hired based on merit and skills, and experience. There are still constraints, such as the Order of Engineers, a professional association that certifies engineers to work in this

area. Porter's (2013) research has much to say about engineering professional associations, and sexual harassment and discrimination. These particular practices are beyond the scope of this study; however, they are underlined as a possible external influence to hiring rules, and values, embraced by an organization.

The relationship between Desrit's anchor points, 'You are the Only One', 'The Mommy' and 'Leader of Harem', and these rules and formative contexts are considered now. Desrit's 'You are the Only One' anchor point is in a relationship with the cisgender stratification rule, as Eliya's 'The Only Girl' anchor point was in a relationship with the only girl here rule. Desrit also learned early on, via her educational experiences and her first job, how to navigate the masculine world of engineering, feeling comfortable within this 'normal' social reality. In contrast to Eliya, however, Desrit does not conform to the masculine culture as Eliya does as we saw via the attributed 'You're so Funny' anchor point. No one who participated in this study, and who knew Desrit, would ever think of attributing Desrit 'You're so Funny' as an anchor point. That she conforms to the masculine culture can be seen in her narrative bubble in her map of identities, where she refers to the constant battle between her feminine and masculine sides. The power-relations that are working in her social interactions, and that are reflected in her storytelling, show a different social reality than that for Eliya's. What is common between the two is that they must navigate a cisgender fine-line, while also performing cisgender in different ways.

'The Mommy' and 'Leader of Harem' anchor points are also in tension with the cisgender stratification rules and with the military, masculine-ideal formative contexts. Desrit does recognize, as other women in this study did, that she must "walk a very fine

line between being ‘like’ the valued-masculine prototype and avoiding any implication that [she is] not [a] ‘real wom[a]n’” (Miller, 2004, p. 68). These relationships also highlight this need for her to walk a cisgender fine line, embracing the masculine ‘Leader of Harem’, and to, at times, perform her feminine cisgender as ‘The Mommy’ reflects.

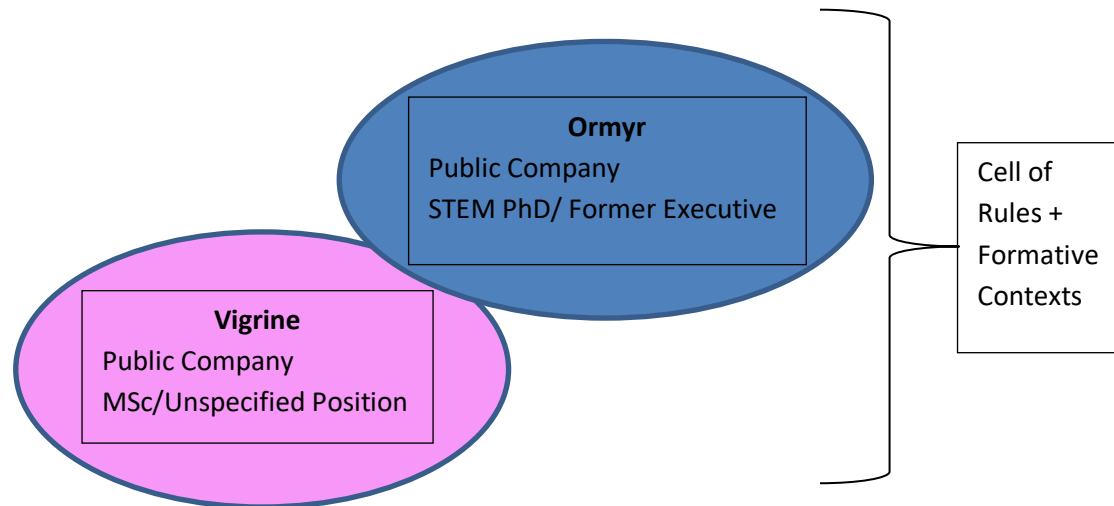
The various rules surrounding the hiring processes at Company Purple also need to be considered in relation with the ‘You are the Only One’, ‘Leader of Harem’, and ‘The Mommy’ anchor points. Desrit was indeed ‘the only one’: not only is she a woman supervisor of all men, she is also the only STEM-professional woman manager who participated in this study. It is important to underline that in spite of her being ‘the Only One’, she is trusted by Company Purple’s Human Resources to hire the staff that she needs to get the job done. It is also important to underline that she does strive for inclusion in her hiring practices. She is limited, however, to hire inclusively due to an insufficient number of viable Canadian candidates, and due to the external constraint imposed by the Order of Engineers. These rules and values ensure that Desrit will continue to be recognized as the ‘Leader of Harem’ of men, as ‘the Only One’, and as the ‘Mommy’.

Vigrine

Vigrine is a woman, mother, and partner, who is passionate about STEM and teaching. Her identities are also constituted by her attributed anchor points, ‘You’re like a dog ...you need to be kept on a leash’, ‘You don’t have a PhD and you’re an ‘old’ woman, you are worthless’, and ‘How can we count on you? You’re a woman, you have kids’. Moving to her cell of influence, presented in Figure 16, it is constituted by Ormyr, her

former supervisor and an executive with public space organization, and Vigrine. I left her position as ‘unspecified’ to ensure her anonymity in this study.

Figure 16: Vigrine's Cell of Influence



The CSM analysis of Vigrine’s discourses resulted in three areas of concern:

Vigrine’s early and late career; her attempts to navigate the cisgender social reality of the space industry; and, Human Resources. Beginning with Vigrine’s early career, she shared many stories that centred on taking jobs that no one wanted. The taking unwanted jobs rule, according to her, would ensure she kept learning and kept her moving through her STEM profession. The unwanted jobs rule was similar to Arwyn’s story telling; Arwyn also took on jobs that were ‘boring’ or that no one wanted. In Vigrine’s case, I return to her different stories focused on the production floor, which I introduced in Chapter Six:

So, I go and nobody ever bit me, they never even swore at me. So, I learned a lot and there were project opportunities. So, then I learned about finance. Then I went to strategic planning and that’s where I wanted to go. Strategic planning was always interesting to me, how to manage a company.

[My boss] invited me to the cafeteria one day and she says to me “[Vigrine], would you like to take the [specific technology area]...”. And I told her: “Look, honestly, if I

said no you would be really stuck”, and she said: “Yes”. So, I took it. In my career, I often took projects nobody else wanted. The whole [specific location project] thing, when I volunteered to take it, I was one of the only ones. Very few wanted it. It was seen as a pile of crap. It was complicated and... I had noticed and found that interesting, so I ended up taking the project that no one wanted. We were shutting it down and now we were bringing it back. People were so demoralized, so I had a motivational problem for the team and once again. It’s a group of people who don’t quite behave like those who are at university, if you know what I mean? They are so vulgar, very direct, so I get used to it. It’s no big deal, I got used to it.

The cisgender taking unwanted jobs rule, in contrast to Arwyn’s experiences which involved fighting for resources or acquiescing, included a social value of wanting to help someone get out of a difficult situation. Vigrine had to take on motivational issues, in addition, to nurture everyone back into a team. She also had to navigate the values of the ‘vulgar’, the ‘very direct’ comments/teasing by the men who surrounded her. I found no evidence in these particular stories of her taking on the masculine ideal of ‘passionately fighting’ as Arwyn did.

Later on, in Vigrine’s career, I found that she focused on the daunting and contradictory occupational position rules she had to navigate in a variety of stories peppered throughout her interview transcript:

[Manager #1] had promised me a position, when I started as [a specific position]. He said “It’s not complicated. We will draft a job description and stick you in it”. So, silly me, I write many descriptions that are never good: “No, that’s not it, start over”. I don’t know how many times I drafted the description, and one day, his secretary tells me: “[Vigrine], that’s not how it works. The job you have belongs to someone else [masculine]. We can’t remove that person, you can’t have the job.” [I responded]: “Are you serious?!” She was very serious.

At the reorg[anization], [Ormyr] asks me to his office and says: “You don’t report to me anymore. They will reorg you. Thank you.” Where am I going? He had warned me that there would be fairly significant changes and he said: “Listen, go take a look at the other managers, I don’t have anything for you”. And as naively as I just said, I did it. I went to see [Manager #2] who said to me: “[Vigrine], what you are telling

me is fun, but are you really meant to be in space...?” [Manager #3] then tells me: “What good news, we have created a position for you!” [I asked myself]: “What’s the deal with all these rules?!”

Someone from HR called me [and said]: “You are red circled”. I don’t know what that means! Then I called HR to ask questions, and twenty minutes later my boss comes to my office to say: “You just called HR and you asked questions? You ask your questions to me.” So, I learned that HR and confidentiality is one thing...

Very recently, and much to my surprise, Vigrine began challenging these contradictory occupational position rules. She moved from asking questions, which follows a feminine ideal, to challenging the contradictory rules, embracing a more masculine ideal of being confrontational, as reflected in these two separate stories:

I get closer to that [mentor] committee, close enough to go talk to them about: “Come on, what’s the deal at the [specific public company]!? There are only men here?” And a colleague [female] tells me: “You’ll have to understand that the women here are a joke, they are [treated like] idiots. All women at the [specific public company] are considered glorified secretaries by all men at the [specific public company], whether you are a secretary or not.”

[Manager #2] sent an email saying: “Hey people, if you are interested [in a position], here’s what it takes, put your hands up”. I wasn’t allowed to compete, so I went to see [Manager #2] with the email and I said “[Manager #2], I don’t see how I do not fulfill this. I don’t see what is typically engineer about this.” He said: “I follow what HR tells me. This is how HR classified it, and I do not have a choice. There used to be a time when a job could have more than one classification, but that is no longer the case”. Perfect, your hands are tied. It’s fun to be [Manager #2] and have your hands tied isn’t it?! I said: “Would you mind if I go see the two other Managers?” And I talked to them in the same manner, telling them that I don’t see why one would have to be an engineer to do this. So, it softened the context a bit, because it wasn’t me a woman, who was saying that it had to be a woman [in this position]. I was saying “Hey, this is a seat saved for engineers. I exist, [another specific woman colleague] exists, tons of other women exist. We clearly aren’t the majority, but we are entitled to career advancement too”. He said: “Fine by me, go ahead”. I went to see [Manager #3] who reacted with fear: “Oh my God, what am I going to say to this woman?!”

Interestingly, Ormyr's discourses showcased a dismissive attitude, mixed with an appreciation for the lack of women in management, in relation to these contradictory occupational position rules:

***Ormyr:** If we think about women in the space sector, which is really it, what we need is new leadership, whether it's male or female, that probably doesn't matter. And that recognizes kinds of things I was telling you about in terms of the role of women, but who also has the balls, whether they are male or female, to fire people, to get rid of the old guard, to realize that at some point your experience, the incremental advantages that your experience brings don't outweigh the organizational benefits, the quality of decision-making, that kind of stuff. And you have to have the balls to say "it's time, old, white men..."*

***Interviewer:** [There is] new leadership...*

***Ormyr:** Yeah, but he doesn't realize that. Well, I don't know, I never have met him, but from what I understand, he's not the visionary-type of person that we need, and although [specific public organization] is a very small organization in the...sense of things, it has a big impact nationally and I think we can set the tone for how space is done in Canada. And until we start, and that is a role for government in whatever sector is setting the example, so at some point we have to make the conscious decision, that [the Executives] at [specific public organization] needs to have at least half of them needs to be women, and [that] they are there because they are women and are good, and that's when things are going to start to change. It has to be that way.*

My CSM analysis of this narrative showcases that the cisgender rule and value of having 'the balls to fire' someone, in one specific organization, is what is expected and needed to effect change with respect to women holding STEM-management positions. In other words, 'it has to be that way' that we must embrace the masculine-hierarchical ideal of change, that someone at the top must do something to get rid of the 'old, white men'. Also, and perhaps more worrisome, the whole idea of cisgender boils down to having 'the balls' as a way 'to get things done'.

The third area of concern is centered on Vigrine and Ormyr foregrounding the limits of Human Resources, an organizational unit within their specific public organization:

The mentorship program is good, I'm very happy that we have it, but up until June, we were still at the point of bringing women towards "Who are you? You are able, you can do this."... Those who are at the [senior] level, there's still a lack of getting them to [executive management level]. That's hard with respect to Human Resources because we fall into the "We cannot do for women what we don't do for men; we can't do for women what we don't do for visible minorities".

Ormyr also talked to the limits of Human Resources as a rule. The following two separate stories, from Ormyr, showcase this rule and how he interpreted its application:

I don't think I was as attuned to those things [hiring women, foreign nationals, Canadians] as I am now, and all we had to do is match the targets, right? They [Human Resources] would tell us how far we were from targets, but we were always under-represented in women in general...

I don't think it [lack of women] was that big an issue. Where it became an issue was in management, right? And it's still stagnant in terms of management. So, if the old white guys don't get out of the way first of all, and there's an issue for La Relève, and then there, I think there's just a cultural blockage...

These narratives highlight some of the goals of Human Resources; notably, having to meet everyone's needs; and, to attain hiring targets. Human Resources could only do what they can for women, as Vigrine shared, if they did the same for men. This rule, of course, ignores the Employment Equity legislation policies other than seeking performance measures. It does attempt to embrace the Canadian Human Rights Act, in the sense of trying to achieve equality for everyone. There appears to be misunderstanding of these meta-rules and their application within this public organization's Human Resource department. There also seems to be a level of ignorance by an employee and an executive as to what these meta-rules are.

Ormyr's reference to a '*cultural blockage*', in the last story shared above, introduces another important value. The ability to move beyond a '*culture blockage*' involves, according to Ormyr, the need to win in the hierarchical game of women in management:

Did she win [a management competition] because she's a woman? Maybe. But there wasn't room for both of them. They both wanted the same thing, both very competent, intelligent, strong people, but they both wanted the same thing and she won. And, it's probably a good thing that I would consider them both equally competent and she was the one that was retained. You have to do that kind of thing, it's a good example of somebody who is, I think, extremely competent and we had the choice, and chose the woman. I think it's a great thing. We lost somebody great, [Male Colleague], really great, I loved the guy, but he realized that it was her, and it was her. And now she's just like, it doesn't matter what her gender is in her current job in the way that she's in this impossible position and all the craziness that goes on, and all the changes in leadership and problems in leadership, and I guess she was acting [Senior Management] for a while, but until she's actually [Senior Management], you are not going to get that women's perspective.

This winning in the hierarchical game is a call to masculine ideals, of competition and of winning. It is also a value that is full of contradictions for women: perhaps a woman 'won' a competition because she is a woman, who happens to also be competent and knowledgeable; then her 'gender' does not matter anymore; and, then a '*women's perspective*' is indeed needed. The oscillation back and forth between having a cisgender, to not, to again needing cisgender, mirrors the contradictory occupational position rules that Vigrine had to navigate as I presented previously. This is a '*cultural blockage*' unto itself that I reflect in the lack of cisgender awareness as a social value.

With respect to Vigrine's range of anchor points, 'On Probation', 'You don't have a PhD and you're an 'old' woman, you are worthless', 'How can we count on you? You're a woman, you have kids', and 'You're like a dog ...you need to be kept on a leash', I turn now to their relationship to the rules and social values found. Vigrine's first three anchor

points, 'On Probation', 'You don't have a PhD', and 'How Can We Count on You?', and their relationship with the taking unwanted jobs rule and the lack of cisgender awareness social value, speak to the notion of meritocracy, and how this STEM-professional woman, in particular, considers merit. Vigrine believed that as long as she kept learning, via taking unwanted jobs, she would naturally keep moving up the structure. She assigned merit to sacrificing her likes, showing loyalty to the organization and expecting the organization to show her how much they appreciated these personal sacrifices. However, as seen in her lack of movement up throughout her career, Vigrine jumped from one 'On Probation' to another 'On Probation' job. She also had to battle her cisgender 'How can we count on you?' anchor point, reflecting the lack of cisgender awareness social value in these attempts to have her sacrifices recognized. No value seemed to be awarded to her ability to navigate unwanted jobs, or the complications of being a woman raising children with her partner while working. These tangled relationships among rules, values, and anchor points was also found with Arwyn's case. The lack of awareness of what STEM-professional women must do to climb the hierarchical ladder, to have merit assigned to what they do on a daily basis, is perhaps best exemplified in Vigrine's 'You don't have a PhD'. Vigrine wanted to do a PhD, but this passion for higher education was pushed down, as a function of her cisgender and her age. Vigrine believed that if she achieved this PhD status, her merit to the organization would be undeniable. Perhaps she was correct in her assessment of merit; however, given the lack of cisgender awareness as a value, as put into evidence in Ormyr's stories, I doubt that she would have achieved the recognition that she richly deserved. The tangled

cisgender social interactions relationships underscore then the difficulties that Vigrine experienced in her specific public space organization.

The attributed ‘You’re like a dog ... You need to be kept on a leash’ anchor point and its relationship with the contradictory rules Vigrine had to navigate reflects the numerous attempts by others to ‘keep her on a leash’. Etzkowitz, Kemelgor and Uzzi’s (2000) work suggest that women are constantly questioned as to whether they should be in their field, or not, and what they are doing in their field. Vigrine’s experiences go beyond this questioning, and beyond the cisgender fine-line that the other STEM-professional women had to navigate; this was obfuscation done by so many individuals in this organization, that I am calling it a relationship meta-rule. By constantly changing the target, Vigrine could never hope to move forward in her career. She was effectively ‘kept on a leash’ via the repeated use of contradictory rules. I challenge anyone to try and navigate the contradictory rules in this organization. I am left with images of Vigrine standing in quicksand, while I read over her transcripts. That she was always ‘On Probation’ ensured that she could not ‘settle down’ into her career, the threat of becoming buried in these contradictory rules ever present for her.

Inenya

Inenya’s map of identities showcased her interdependent and constituting identities. Specifically, she self-identifies as a single parent, who is fierce, and who is attributed the ‘Girl Engineer’ anchor point. She also embraced masculinist discourses, symbolically represented via a bullwhip and a perfect target, and displayed these items in her office. She developed an alter ego, her ‘evil twin’, as a way to resist some of her anchor points,

including ‘Is She Supposed to be Here?’ and ‘The Secretary’. As I discussed in Chapter Five, Inenya’s cell of influences was constructed only from her discourses.

As for the other participants in this study, there were three areas of concern with respect to the rules and formative contexts in the public company Inenya worked for: her early and late career experiences; hiring processes; and, her family life and work life. Beginning with Inenya’s early career, she believed that there were ‘*no issues*’ with respect to diversity in the STEM work force of the space industry. Diversity was inherent in the specific private company she worked for, at the time, captured in this analysis as a social value:

[Specific company] was no issue. [This specific company] was a mix [of] men and women, and treated all equally across the board. I never had any issues at [this specific company]. It was interesting, though, when I go back to the work at [another specific company], when I first started out, the group that was doing the test bed for the robotic software were a very [diverse] group. I’m talking about Turkey, Hungary, Malaysia, Africa, China. I don’t think we had any South Americans, but it was a very – and it was men and women – just all over the board. Really, really interesting group.

Inenya also outlined the engineering work ethic rules in these various space organizations, early in her career, in the following two independent stories:

Like I would go to the engineers, and when everybody wanted to have an office at the front of the building, I had a cubicle right in between the electrical engineering and the mechanical engineering department, and I remember [them] just saying, “Do you want to move to the front?” And I’m like, “No, because I can see what they’re doing! And I can go bug them if I need something and see them working on another project and they’ll get too embarrassed and then they go work on the project for me”. So... I used to argue with one of the managers a lot because I would give him a hard time saying, “We need to get things done.” And he would be diverting his resources to something else, and I would just give him hell for it and then go back and tell him, “No, you have to do my stuff first!”

Because as an engineer, if it's not 100%... they're not going to say yes. So, it's a little bit of being able to... being able to be not just an engineer but a project manager, I think. [If] it's at 80% then I'm willing to say, "Yes, we have to do this" and fight for it. It's always been [that way] for me. I've gone up against it. There's [been] like three instances where I have to push an issue and a lot of times we've had to go back and prove it which...that's the way he works and that's fine, you know, and that's not me...

These two stories showcase that most engineers would, according to Inenya, covet such things as being at the 'front of the building' (elite values) while moving away from working in the 'trenches' of the cubicles (working-in-the-trenches values). Similarly, other engineers, in her experience, would want 100% assurance (perfection value), while she was comfortable with going forward with an 80% 'Go' (realistic value). She was, in these stories, not only sharing what these values were but also, she was showcasing her ability to resist the masculine engineering driven-values of elitism and perfection.

Moving to her later career, Inenya was no longer trusted to perform as she had done in her previous space industry positions. This no trust rule was best represented in the following story:

The "Oh no, you can't do that until you've gotten full approval," and "Why can't I take up the phone and talk to the guy because he's the one I need the information?" "No, you can't do that," and... it was... it was just a big personal shift for me to... I was the only girl in the group for the hardware and the software ...so after [specific company] it was the [specific public organization], and that was a big change. Just the idea being public servants in a bureaucratic world, it took me a long time to adjust. Yes. 'Cause I just wanted to get things done. I knew how to make things happen and get things done...

In this story that showcases the no trust rule, Inenya no longer has the freedom to make a call, to resolve an issue, or to ask a question to 'get things done'. This shift, from being a recognized expert in her field to having to seek approval for everything she does, is in

spite of her extensive STEM experience in the space industry, her training and her certification as an engineer.

In the second area of concern, hiring processes, Inenya reflected on these processes within the public organization that employs her. As presented previously in Arwyn's analysis, the 'inhuman' pool hiring rules were also prominent in Inenya's narratives:

So, the [specific competition] pool... it was... the last time around, it's very strenuous. It's very stressful. And when you think about it, it's stressful for an opportunity to be in a pool...with no guarantee [of a job]... The last time around, it was a three-hour test on a computer, the hardest part was the exam. It's three hours on the computer, and I did not stop typing and clicking for a whole three hours. I stayed till the last minute. And then I walked out of there, I had a stress on my brain that went from here down to the back of my arm. And I had to go home, and I had to knock myself out with drugs because there's no way I was going to get over it. I was so sick from the stress. Just the whole side of me was so stressed out. So, you have to keep going through the stress of this whole thing, over and over and over again....

They said I failed. I did not pass the interview... [I] actually went in and had to do that whole psych evaluation thing that... [I] went to a thing downtown... So, I mean it was fine. I... I had just – so this was when we had H1N1. And I had had to postpone the interview twice because first [child] got it then I got it. [Child #2] had it, then [child #1] got it again, so I had like three weeks that I was just out of it. And I came in, and I was still sick but I had to come in because I had no more sick days. I couldn't postpone it anymore. And I wasn't calling in sick because I didn't have sick days [left]. So... so I didn't remember a lot about it. I thought I did well. But when I came in, they said that I didn't emphasize enough things that I did when they were asking questions at a supervisor level. I kept talking about people I had supervised, and working with them on their plans, and how well they had done them, and they said I didn't focus enough and give enough evidence of what I did.

Inenya's lived reality was such that she was (and still is) a single parent, struggling, in this story, with two very sick children. She was also suffering from H1N1, and was ultimately unable to postpone an interview for a third time, after having done a number of hiring evaluation activities, for a job that didn't necessarily exist. In addition, as the first story highlights, she had to write nonstop for three hours, causing extreme 'stress on my

brain'. Such practices, for a late career STEM-professional woman who is a single parent, raises the following question: why would it be necessary for such an individual to be evaluated in such a way for a non-existent job? The 'inhuman' hiring practices ensure, to a certain extent, that the 'human' aspects are not valued by the organization.

The third and final area of concern moves to this question of Inenya's home life, and how she manages home and work life. The five separate stories, presented below, underscore the infantilizing work rules that are used with respect to STEM-professional women. They also underscore the absurdity of Inenya's attributed 'Girls Don't Do Anything' anchor point:

Between January and July of 2006, I made sixteen [business] trips with two kids and I don't know... I have babysitters. Because [child #1] was in school, and [child #2] was in daycare, and there were three daycare workers, I slowly cycled through all of the daycare workers, and I just worked it out that I gave them plushies, playpens for [each child], and literally when I dropped [specific child] off, either in their apartment or in their car, and they would, you know, they would take care of [the children]....

When [child #2] came, then I couldn't take both of them [on business trips], so easily... but I would always take [child #1] down, and drop her off with my folks. I stayed with my folks. And I'd drop her off there, and my sister would come in, and they would just play. And they would play with the baby. So, it's... it always worked that way for Houston, unless it was a really short trip, and then it got kind of hard on the [children].

As a single parent, it sucks. It does. I mean I even take vacation days just to take a day off to get things done. Because I don't want to go through the hassle of asking for...well, you know... and in the meantime, you know, you've got your hours for your family appointments. Well, between the two [children] and all the appointments that I've had to go through, I usually run out of those hours by about December.

It's like they're so strict. No overtime, no overtime! Well, I tend to flex my hours during the week anyway, especially in the summer I'll come in a little bit late, I'll stay late. I'll do two days really late or whatever, you know. And it's just, it's a really bad... it's a really bad environment in that respect....just the point that you have to

ask someone permission...to manage your life...that's irritating...I would often work in my bed at three o'clock in the morning with the laptop, in my pyjamas and nobody ever gave [a damn]... and then the thing that...irritates the most is they – when you ask about working at home – [they say]: “Well, you know, you really need to, when you're at home, you need to focus on the home and not have work there. That's more stress and...” That's the BS that we get, you know!?! Can I just do what I need to do?! As long as I deliver it to you, does it matter when I do it and where?

I remember as an acting [supervisor]... as an acting being told: “You know, you really have to manage people's time.” And I'm like, “I shouldn't have to at this level. We're professionals.” And I don't want to know the details of your life. If you have to do something, you go do something. You get your work done for the week, and I don't care when, where, or how.

Inenya's level of frustration with respect to these infantilizing work rules comes through in these stories. How anyone could assume that Inenya 'doesn't do anything' and how her time must be 'managed' by others defies comprehension. These stories focused on her family life and work life resonated for me: Inenya and I were both constantly trying to juggle time, and commitments, finding loopholes where we could, to deliver on a project, or getting a child to a doctor's appointment, or a school function. In spite of this constant juggling, and her reliable delivery on multiple projects, her supervisor chose to be minimally aware of her lived reality:

He [Inenya's supervisor] would always come up to talk to me at 4:30, 4:15 sometimes, and I would look at him – he would come up and I would look at the time, and I would say: “You know you only have a few minutes”. And, he would get talking, and then I would see what time it was and it's like, “If you want to continue talking, you have to walk with me out the door because I gotta go. I go across the bridge, I gotta go for two pickups.”

I've demonstrated, in the previous stories, the absurdity of the attributed 'Girls Don't Do Anything' anchor point in relation to the infantilizing work rules and the practiced ignorance of Inenya's direct supervisor. Similarly, 'The Secretary' anchor point reflects

these infantilizing work rules and their application to women in general. Moving to Inenya's two remaining anchor points, 'Girl Engineer' and 'Is She Supposed to be Here?', and their relationship with the rules and values found, there are subtleties that need to be untangled. Notably, the 'Girl Engineer' anchor point and the engineering work ethic highlights that Inenya was able to do things 'her' way, such as embracing an 80% tolerance, in spite of being a 'Girl Engineer'. Similarly, she was able to oversee the work being done by subordinates in contrast to other engineers who sought the elite office. It is important to underline that in her early career, diversity as a value was embraced and obvious in the everyday work life. So, in spite of being a cisgender 'Girl Engineer', she was able to complete the work and to gain a level of respect via such values as trust.

As for 'Is She Supposed to be Here?' anchor point and its relationship with the 'inhuman' pool hiring, there was a double entendre with this attributed anchor point and her pool hiring interview experiences. On the one hand, the individual who assigned her this anchor point, in a meeting setting, questioned the viability of her being in the room as I presented in the previous chapter. On the other hand, given how sick Inenya was, one could argue that she should not have been participating in the interview, fulfilling the direct meaning behind this anchor point – she should not have been there! Inenya did not belong there because all three individuals in her family were horribly sick. Inenya forced herself to perform, when she should not have been in that position. Furthermore, Inenya made reference to burning through all her sick leave, a common complaint among many STEM-professional women, this goes to the resilient discourses I introduced at the beginning of this chapter. Within her specific lived reality as a single parent, it is important to consider this dynamic. In the academic literature, Lilly (2008) found that

unpaid caregiving was negatively associated with labor force participation but that the impact on hours of labor market work was uncertain. Brennan and Brannan (2005) found caregivers of children (with special needs) experienced greater strain related to missing work, and some decided to withdraw from the workforce altogether. Rosenzweig and Huffstutter (2004) found that 48% of respondents had quit work at some time to care for their special needs child, and 27% had employment terminated because of disruptions caused by child care responsibilities. Brennan & Poertner (1997) reported, based on a sample of 184 caregivers of children with serious emotional or mental health challenges, "considerable" work and child-related stress for those caregivers employed outside of the home. They also speculated that perhaps these caregivers had "become expert at compartmentalizing the unpredictability and stress of their home life and their work stress" (Brennan & Poertner, 1997, p. 246). While some individuals may wonder if Inenya 'Is Supposed to be Here?', the speculation should be on why the accommodations necessary to ensure that she is able to be 'here' are not addressed more succinctly and clearly. In addition, that she can manage intricate space projects to successful completion, while also navigating child care for extensive business travel, should be coveted and recognized.

Summary of Forms of Context Relationship with Anchor Points

This chapter presented a range of meta-rules, rules, and formative contexts, and their relationship with the six STEM-professional women's range of anchor points. In the table below, a summary of these findings and relationships are presented as a way to provide a concise answer to the first part of (RQ2). This summary is organized via the career stage of the participants and then by the individual participant.

Table 5: Summary of Relationship between Rules and Formative Contexts with Range of Anchor Points

Career Stage	Participant	Meta-Rules and Rules	Formative Contexts	Anchor Points	Relationships
Early Career (under 5 years)	Geirit	<p>program/project cancellations meta-rule</p> <p>demarcation between program and functional management meta-rule</p> <p>demographic rule: 'standard' rule of 20%</p> <p>cisgender structures rule</p>	<p>Old Boys Club values: "<i>behavioural modifications</i> [of men]", women expected to 'fight back', and questions as to "why is she here?"</p> <p>Pornography in the work place as a social value</p> <p>controlling space structures and women: "<i>the big boys</i>"</p>	<p>'The Leader'</p> <p>'The Bitch'</p> <p>'Females are More Serious'</p>	<p>Walking a cisgender fine- line: positioned as the cisgender Other</p>
	Eliya	<p>education elite rule</p> <p>the only girl here rule</p> <p>being put in her place</p> <p>being adaptable as a rule</p> <p>demographic balance rule</p>	<p>'elite' education/work</p> <p>women are targets for men's teasing, and are there to be admired</p> <p>trust value in the interview process</p> <p>adaptable value</p>	<p>'Elite'</p> <p>'Not Very Serious'/'You're So Funny'</p> <p>'The Only Girl'</p>	<p>Walking a cisgender Fine-Line</p> <p>Embodying being 'The Only Girl'</p>

Career Stage	Participant	Meta-Rules and Rules	Formative Contexts	Anchor Points	Relationships
Mid-Career (over 5 years but under 15 years)	Arwyn	<p>‘more human’ interviews vs ‘inhuman’ pool hiring rules</p> <p>cisgender multi-tasking</p> <p>cisgender presentism</p> <p>cisgender taking unwanted jobs</p> <p>masculine ideal of ordered assignment</p>	<p>no value assigned to cisgender multi-tasking</p> <p>gendered winning award</p> <p>masculine, aggressive ‘pulling all aces’ value, versus feminine ‘acquiescing’</p>	<p>You are a [junior] ENG and you travel?!’</p> <p>‘Control Engineer’</p> <p>‘Time to Move On’</p>	<p>walking a cisgender fine-line</p> <p>‘inhuman’ hiring rule does not guarantee recognition as ‘Lead Engineer’</p> <p>Tangled cisgender social interactions: doing more, qualified professional, others have ‘Moved On’</p>
Late Career (over 15 years)	Desrit	<p>cisgender stratification in engineering and in military</p> <p>supervisor is trusted to hire person she/he needs as a rule</p> <p><i>Order of Engineers</i> (external environment) constraint</p>	<p>feminine ideal is represented by secretaries as a value</p> <p>military, male-dominated in space values</p> <p>trust value</p>	<p>‘You are the Only One’</p> <p>‘The Mommy’</p> <p>‘Leader of Harem’</p>	<p>walking a cisgender fine-line, between assuming the masculine and the feminine</p> <p>pipeline/external constraint will ensure she continues to be ‘the Only One’</p>

Career Stage	Participant	Meta-Rules and Rules	Formative Contexts	Anchor Points	Relationships
	Vigrine	<p>cisgender taking unwanted jobs</p> <p>contradictory occupational position</p> <p>cisgender rule of 'having the balls' to win the hierarchical game</p> <p>limits of Human Resources: confusion re Employment Equity and Canadian Human Rights Act</p>	<p>lack of cisgender awareness social value: "<i>cultural blockage</i>"</p> <p>embracing feminine values: helping others, nurturing/motivating</p> <p>navigating masculine values: 'vulgar', 'very direct', '<i>the balls</i>', dismissive</p> <p>embracing more masculine values: confrontational, hierarchical ideal of change</p>	<p>'On Probation'</p> <p>'You don't have a PhD and you're an 'old' woman, you are worthless'</p> <p>'How can we count on you? You're a woman, you have kids'</p> <p>'You're like a dog ... You need to be kept on a leash'</p>	<p>Tangled cisgender social interactions</p> <p>Obfuscation meta-rule of relationships</p>
	Inenya	<p>engineering work ethic</p> <p>late career: no trust</p> <p>'inhuman' pool hiring</p> <p>infantilizing STEM-professional women at work</p>	<p>early career value: diversity</p> <p>masculine engineering values: elite, perfection</p> <p>resistance: working-in-the-trenches, value, more realistic values re perfection</p> <p>'humans' are not valued</p>	<p>'Girl Engineer'</p> <p>'Girls Don't Do Anything'/'Is She Supposed to be Here?'</p> <p>'The Secretary'</p>	<p>Tangled cisgender social interactions</p> <p>Absurdity</p> <p>Focus in on wrong state of being: focus on accommodations</p>

The next chapter, Chapter Eight, will present the results of the analysis focused on forms of experience. This analysis showcases the range of anchor points, and their

relationship with dominant discourses, and socio-psychological processes. The chapter also considers the question of the experience of exclusion, for the six STEM-professional women, in this study.

Chapter 8: Discourses, Critical Sensemaking Processes, and Exclusion of STEM-Professional Women

This chapter addresses the relationship between the range of anchor points, dominant ideas and practices, and the critical sensemaking processes of the six STEM-professional women who participated in the study. I critically examine these relationships, providing another forum to promote the STEM-professional women's stories and narratives within the Canadian space industry. The centrality of the STEM-professional women's identities feeds into the dominant ideas, bringing to light not only the individual but also the ongoing, critical sensemaking processes that are at play for her within the contexts in question. The critical sensemaking processes can ebb and flow, changing from one day to the next, from one moment to the next, from one social interaction to the next; and so these processes reflect the power-relations of the everyday, and are captured in the participant's stories and narratives.

This chapter brings the final branch of the theoretical framework, and the experiences of discourses and critical sensemaking, together to answer the two last parts of RQ2: what is the relationship between selected anchor points and discursive (interrelated dominant ideas and practices), and socio-psychological (e.g., critical sensemaking) processes? This chapter begins with observations and findings across all the STEM-professional women, who participated in this study, with a focus on their dominant ideas and critical sensemaking processes. Each STEM-professional woman, grouped by career experience, and her particular dominant ideas and critical sensemaking processes are then presented. The relationship of these experiences and her particular range of anchor points are then addressed.

The ‘how’ of the exclusion of these STEM-professional women, within the Canadian space industry, and the question of social change, closes out this chapter. This section answers the third and final research question (RQ3): how do these anchor points influence the exclusion of STEM-trained women from management/executive positions within this industry?

Discourses, Critical Sensemaking, and Exclusion Experiences: Observations and findings across all participants

The examination of experiences, specifically, discourses, critical sensemaking, and exclusion, for the STEM-professional women in this study was diverse. There was, as a result of this diversity, only one observation I can make across all the participants. Kvale (1996) cautions us to not ask direct questions, but to let the participant present themselves on, and in, their own terms. I was very much aware of this recommendation; however, I wanted to see what kind of response I would receive if I asked a direction question. When I did ask a direct question about cisgender, and my participant’s experience of exclusion, to two of the six participants, the first individual, a STEM-professional woman, stated emphatically that they had had no experience with discrimination due to their cisgender. The other individual, a STEM-professional man, stated that there was no discrimination based on cisgender in this industry.

In a similar vein, when I asked all individuals my clearing question (i.e. is there anything you would like to add to our conversation that I have not asked you?), at the end of the interview, the participants would invariably state that the industry was not discriminatory. A couple of participants went so far as to be completely perplexed about how our conversation tied in to my research about women in the space industry, and the

'sexism' that I was 'trying to find'. This observation is rather telling, as it reveals that the participants in this study did not 'see', or reflect on, discourses and power-relations that were at work in this context of meta-rules, rules, and formative contexts.

With this observation in mind, I now present the results of the analysis focused on forms of experience, and their relationship with an individual's range of anchor points.

Early Career

Geirit

Geirit, as I reconstructed her in Chapter Six, is a 'female', who is a 'PhD', who embraces her 'take it or leave it', and her 'long-term single' self-identities. Her attributed 'Females are More Serious', 'The Bitch', and 'The Leader' anchor points are also part of this reconstructed individual. I looked, in this particular phase of the analysis, to the relationship between these anchor points, and the dominant ideas and practices that she shared with me during her interview. I found that, in contrast to the participants who were in the later part of their career, Geirit's dominant ideas were less obvious. The relationship between her anchor points and these dominant ideas was, as a result, challenging to find and to define.

There are two dominant ideas that I did eventually find, and that I concentrate on in this analysis. These ideas centred on her 'female-ness' social-identity, and the 'I'm long term single' self-identity. With respect to the first dominant idea, I highlighted in Chapter Six that Geirit did repeatedly use 'girl' and/or 'female' across all her stories and narratives when she talked about herself or other women. She reflected on this 'female-ness' social identity within the Canadian space industry in the following two stories:

Job Interviewer: *“We prefer to hire females because we find that they’re more serious about their work than the guys are.”*

Geirit’s response: *And I was like, “That’s just ridiculous”... I don’t want to be hired based on that!*

The first excerpt does not convey the extent of her emotions surrounding her ‘female-ness’: she emphatically, and forcefully, stated that her ‘female-ness’ had nothing to do with being hired. She convinced me, with her forcefulness, that this could not possibly have any bearing on her work. Another brief narrative, along these same lines, is shared below:

Geirit: *They knew me, they had seen my work... so that’s positive toward females, but I don’t want to see that...*

In this second narrative, she also again emphatically admitted that she didn’t want to ‘see that’ her ‘female-ness’ had anything to do with her work. Her merit and skills, as the first dominant idea that I extracted from these narratives, needed to carry her work, and not her ‘female-ness’ identity.

This idea of merit and skills is tricky to extract given that I also found that the attributed anchor point of ‘Females are More Serious’ was intertwined within her discourses. On the surface, one could think that anchor points and dominant ideas such as this one is one in the same. However, this is not the case. The important distinction is that the anchor point is given by someone else to an individual, and then that same individual can build that attributed anchor point into a narrative or a story. They are, in essence, a way to make sense of the social world, carrying a reconstructed dominant idea forward such as merit and skills.

These dominant ideas can also showcase important resistance discourse, as it did in Geirit’s case. Specifically, Geirit refuses, emphatically, to ‘see’ that her ‘female-ness’ has

anything to do with her STEM work. Her work is what counts, showcasing her resistance to a social-identity, and not an identity.

With respect to Geirit's second dominant idea, centred around the 'I'm long term single' self-identity, she was adamant and forceful as to 'who I am'. This is best reflected in the following narrative:

I'm long term single: if you actively don't want kids, it sort of changes the importance of all that [being in a relationship]. I've moved around a lot all my life, so I'm perfectly accustomed to, you know, not knowing anybody, and just being on my own.

This narrative led me to ask more questions, than to find any definitive answers with respect to her dominant idea of being 'long term single', and to its possible relationship with her anchor points. Specifically, I asked: was Geirit attempting to conform to the dominant male culture, as Miller (2004) suggested that most women do when faced with a male-dominated work context? Or, was Geirit's internalization of this 'long term single' identity categorization, and her resistance to notably 'The Bitch' anchor point, with its cisgender connotations, reflecting a wish on her part to conform to a male-dominated culture? Or, was Geirit performing her social-identity of cisgender as an 'undoing'? In other words, was she embracing her 'long term single' self-identity, with the goal of wanting to act like 'one of the boys' (Powell et al., 2009), by embracing 'The Leader' anchor point? There are no clear answers to these questions; they are, however, noteworthy to showcase as stand-alone questions.

Turning to Geirit's map of identities, in Figure 7, it captured a meaning-making layer reflecting some of her plausible sensemaking processes. In Geirit's discourses surrounding the attributed anchor point of 'Females are More Serious', she again emphatically stated that "*that's just ridiculous*", and resisting this anchor point. Moving

to Geirit's aspirations within the space industry and her 'The Leader' anchor point, there was one important exchange that I reproduce here:

Geirit: *I can't picture myself being happy, doing the same thing for 20 years. So, whether it's up or sideways, I'm interested in going where it's interesting, where I can be useful, where I can be good at what I do.... So, yeah, primarily it's going to be up... I would rather have 10 years of experience in something technical and then go do that rather than do that [be a manager] off the bat because I feel like you can go toward management, but it's hard to go back toward technical if you haven't been doing something technical for 10 years – it's hard to get back. My management's always given me positive feedback. You know, that's a reasonable expectation [to become a manager] for me, let's put it that way.*

Interviewer: *Are they helping develop your management potential?*

Geirit: *Specifically, management potential? I would say not yet. Leadership potential, I would give you that. I've been Technical Lead on a number of studies. They brought me in as Technical Lead on [specific project]... I'm fairly outspoken, so I think it falls naturally that I go into that role as a leader. I have no problem voicing my opinion or asking for information or whatever or telling people [what to do].*

Geirit's beliefs about becoming a manager were centered around two primary notions: being technically-knowledgeable first, and developing her leadership potential through merit, second. Her 'Technical Lead' positioning, again akin to being a supervisor with subordinates, would help her to develop her technical knowledge, according to her beliefs and actions. She also brought in her performance appraisals, from her various managers, equating the positive feedback in her appraisals to there being a "reasonable expectation" to becoming a manager. Importantly, however, this management potential was not being developed by her managers, or by the organization or, from what I could tell, by her. What was being developed was her ability to embrace the anchor point of being 'The Leader'.

Her critical sensemaking processes surrounding ‘The Leader’ anchor point showcased that she was following what she believed to be a ‘reasonable’ progression: technical skills/merit, embracing being ‘The Leader’, and then naturally becoming the manager. This ‘reasonable’ progression mirrors, as I pointed out in Chapter Six, the academic literature; that is, Geirit has a cisgender understanding of merit and skills, where her career progresses reasonably/logically. This cisgender understanding of being a manager, via a progression through the technical/merit, being the ‘outspoken’ leader, may well fit in the military hierarchical system that governs engineering (Hacker, 1989). It is counter to, however, the overall demographic meta-rules of this industry, as I pointed out in Chapter Two, where STEM-professional women do not statistically become managers in the Canadian space industry.

Eliya

Eliya, as I presented in Chapter Six, is a ‘girl’ who embraces her feminine attributes, her STEM accreditations, and STEM-experiences, while navigating being ‘The Only Girl’. She found herself among the ‘Elite’, while also navigating being attributed ‘You’re so Funny’/ ‘Not Very Serious’. Given my challenges working within Eliya’s case, as I highlighted in Chapter Six, I decided to follow the same process as I had done with Geirit’s case. I focused on the centrality of identities in order to tease out the dominant ideas and practices shared in stories and narratives. I found in Eliya’s case, that her ‘deferential’ self-identity came out strongly throughout her interview. As a feminist and as a sensemaker in my own right, I found some of Eliya’s stories surrounding this self-identity to be difficult to read, and to acknowledge. These stories nonetheless reflect her sense of self that I could not, and should not, ignore.

Eliya's 'deferential' dominant ideas and practices centred around her relationship with her boyfriend, and to the various choices she had to make with respect to her career:

I looked at international postings because I was ready to leave, and I found something in [Europe].... That would have worked for me, but in the mean time I met a boyfriend who didn't want to go to [there], so I said no to this offer.

The posting was for [specific location] and I really wanted to move there, but the conditions that were offered were... Well, not in the state I was in. My boyfriend and I had separated.

Eliya turned down a position in a specific country because her boyfriend didn't want to go there. She also turned down another position because she had just separated from this same boyfriend. Eliya's dominant practice, of deferring some aspect of a career due to emotional attachments, reflects women's historically practices in negotiating home life and a career. Notably, Ruel et al. (2017) brought forward evidence of White women who worked in the US space industry in the 1960's who had left their careers to get married or take care of children. I could not ignore Eliya's deferential practices, or her stories surrounding this practice; if I had, I would not be plausibly reflecting who she is, and who she is becoming. What is interesting with this dominant practice is the tension with her attributed 'Not Very Serious' anchor point. She obviously took her relationship with her boyfriend very seriously, pushing aside career moves that could have helped her develop her knowledge and experience. However, she embraced the feminine ideal in the shape of being deferential to her boyfriend's wants, while also trying to work in a male-dominated industry, and appearing to be 'Not Very Serious'.

With respect to Eliya's critical sensemaking processes, I focused the analysis on two out of three anchor points, 'Not Very Serious' and 'The Only Girl'. These specific choices were made in order to showcase one aspect of the unstable context, and the

cisgender that occurs, within the Canadian space industry. The unstable work context, and Eliya's sensemaking of this context, are reflected in the following four narratives:

If I have to stay at work for 10 hours a day, I'll stay 10 hours a day because [it's what I can do]; but on the other hand, I'm working towards taking some sabbatical leave to travel.

The worse that can happen is that I leave and find something else... 'it's no big deal if you fire me, I'll have some time off! [laughs]

After [specific program], I'd like to leave for a year and really take advantage of discovering new things.

And, on top of it, I'm always giggling. I imagine people perceive me as less than focused on my things.

I found that these discourses, along with some others, brought to light how Eliya made sense of the unstable nature of her work life. Her repeated calls to taking time off, planning for travel, etc., led me to a better understanding of who she is and who she is becoming, and how she protects herself and, ultimately, her identities. Notably, I gained a better understanding of how she could have been attributed the 'Not Very Serious' anchor point: if she consistently shared with others in the industry this wish to 'discover new things', and her plans to take 'some sabbatical leave to travel', colleagues would start to question her commitment to this industry, and reflect this in her anchor point of 'Not Very Serious'. Also, this 'Not Very Serious' anchor point could also reflect a resistance discourse: to protect herself, and her identities, from the ever present and tangible prospect of being fired, she presented a devil-may-care attitude, thereby shifting the power-relations in her favor.

As for the cisgender processes in the Canadian space industry, the following two stories bring forward Eliya's day-to-day interactions with certain individuals:

I was insulted over the phone by a guy from [a specific company]. Apparently, he has an issue with girls at work. With [specific girl] there had previously been a concern. So, in fact, I found a problem on the [specific project] that nobody else had noticed, and as I was new, I wanted to be sure. So, I asked lots of questions to be sure I understood properly before sounding the alarm, and as he had worked on it, I asked him about it. He replied that it wasn't his fault if I didn't know my stuff, and it definitely wasn't his job to train me, and so on. He had yelled so loudly that two offices down, behind closed doors, they had heard...

Yeah, that was intense, because in [Europe] I would have needed ten years of experience to get to a job like this, and it was cool that they gave me a chance, and I was so overwhelmed during my first two years, and yeah, not only being young, but also being a girl, it wasn't always easy.

The critical sensemaking surrounding this story centers on Eliya's ability to navigate an emotionally charged interaction with an individual who had 'issues with girls'. I can state with no reservations that, in any circumstance, in any context of rules, meta-rules and social values, being yelled at is simply unacceptable. To Eliya, though, she was yelled at because: (1) she was a girl; and (2) as a girl, she was asking too many questions. So, it was acceptable that this person would react to her in this way. I, unfortunately, also found evidence of these types of stories in Vigrine's and Inenya's transcripts. I have also been subject to this type of behavior on a number of occasions. The unfortunate reality for women in the Canadian space industry is that this type of story, being yelled at for asking too many questions, is all too common. In Eliya's case, she was trying to make sense of this individual's bad behavior: her retrospective cues included that she did not have the years of experience necessary to 'know' what she didn't know, and she was, after all, harboring such attributed identities as 'The Only Girl' who is 'Not Very Serious'. She sincerely believed that she had to endure, and had to learn to navigate, this type of treatment by a senior colleague who was a man.

Mid-Career

Arwyn

Arwyn, the sole mid-career STEM-professional woman, was recreated as a ‘girl’, mother and partner. She was attributed the ‘Control Engineer’, the ‘Time to Move On’, and the ‘You are a (lower level) ENG and you travel?’ anchor points. With respect to her dominant ideas and practices, there were two stories that I found during the CSM analysis of her discourses. Both stories had complex interrelated ideas circulating around her self-identities, social-identities, and anchor points. These dominant ideas also reflected general rules of society, and rules of the space industry.

The first dominant idea begins with Arwyn’s search to ‘find herself’. This dominant idea embraces some general rules of society, as she interpreted them, and the cisgender multi-tasking rules, presented in Chapter Seven. The following story showcases this dominant idea:

I’m still finding myself. I think I’ve followed the rules for a long time...I was good in science. I came from a modest family so doing many years of study was out of the question. I did my bachelor’s in engineering, so I’d have a job afterwards. I did what I had to, and my life worked out well, I got married, which might have also been following the rules, getting married, having kids, you know? Those are choices I made, but I realize now, as I get older, that I’m still looking for where I belong. And who I am, individually, I think I’m still trying to find where, who I really am, even if I’m [specific age] now. Maybe it’s not something we ever really know. We experiment, and now I’m experimenting in my own way...

This story is important as it reflects some empirical findings in the academic literature. Notably, Etzkowitz, Kemelgor and Uzzi (2000) found that women in male-dominated fields question repeatedly why they are there, and what they are doing. There are nuances to Arwyn’s dominant idea that the literature does not address. Specifically, she connected the interrelated practice of following the rules – whether it be society’s or an

organization's – with being left questioning, and exploring, what her choices should be, and where she belongs. This questioning/exploring is clearly in a relationship with her attributed 'Time to Move On' anchor point. The nuance comes forward also in that she framed this exploration within the rules of getting a good education, of a belief in the value of merit and skill, and in the development of her talents. This framing, she believes, should 'win' out in her search for herself.

The second dominant idea is focused on Arwyn's exploration of higher education, and the cisgender approach of doing so for those who work in the space industry:

Where does my dissatisfaction stem from? At some point, that's what it is, we aren't satisfied with where we are, and that's why we look elsewhere. So, I'm really interested in that, understanding what I can do. Something else I've noticed is that it's mostly women who go back to school. I think that's interesting and deserves to be highlighted. None of my male colleagues will go [back to school]. They might do an MBA, or something like you did, but to go back to school for a real career change, I don't really know any[one].

Arwyn, in this story, perceives a marked difference between how cisgender men and women pursue higher education. It is noteworthy that almost all the women in my sample had higher degrees (i.e. Masters, PhDs). Almost all the men in this study had achieved only an undergraduate degree with no intention of identified to pursue graduate work. This dominant idea, of women pursuing higher education, is supported in the academic literature. In particular, some women excel and, in some cases, surpass men in the technological/technicist side of engineering and accreditation (Faulkner, 2007; Robinson & McIlwee, 1991; Sharp et al., 2012). This dominant idea of a cisgender pursuit of higher education also feeds into Arwyn's attributed 'Time to Move On' anchor point in the sense that she believes her graduate work will open new opportunities for her. This cisgender pursuit of higher education also gives Arwyn's resistance discourses a certain

credibility with respect to the attributed ‘Control Engineer’ anchor point, as discussed in Chapter Two.

Turning to Arwyn’s critical sensemaking processes, there was a particular stream of stand-alone stories that needed to be considered as whole in this part of the analysis:

I have to tell you I was pampered during my studies, I received scholarships offered to girls and things like that...the place of girls in engineering is not really discussed at university, because we are pampered. The boys are really happy to have us, the ten female students out of 100, so we are always treated well.

It took over a year to fill the [specific engineering] position, but that’s how I got my permanent position at the [specific public organization]. That’s where I became aware of discrepancies towards women in science and engineering. So, I figured I’d go check the [specific women’s committee] group out. At first, I couldn’t relate to the things they were telling me: “No, no, look at how well I’m treated!”, and I’d say I felt more of a change within the last five years.

I could say that I had always been a bit desensitized. I did five years, no six, in an engineering faculty and some of the things that happen there are hard to digest, and I experience that, even with my two brothers, though they have always been really nice to me... But, you know, I have heard jokes and stuff. It’s possible that I heard some jokes but that’s not necessarily what had an impact on me. It was more the difficulty in obtaining equivalent projects to those that were given to the boys. You know, for an equivalent job, not even speaking about promotions, just being tasked with equivalent work...when the projects were distributed, I never seemed to receive anything important....

I’ve asked [Jorodr] whether I’m incompetent, no good, and he says “No, you’re great”. So, I’d say that in wanting to protect me, he made me lose [my] self-confidence. I’m sure it wasn’t a conscious effort, there was no ill-intent, no: “Oh my god, it’s a girl, I don’t want to give it to her”. He knows I can do it, but [he has this attitude that]: “I don’t want to give you too much, you are already overwhelmed”.

In this sequence of separate stories, the ongoing nature of her making sense of her social experiences moves from noticing that she was coveted within the engineering educational field, as one of the few women in this field, to an awakening that something wasn’t ‘quite right’ once she achieved a position within a space industry organization. She sought out

other STEM-professional women, during this awakening, believing they could shed some light on what wasn't *'quite right'*. She found, however, that she had no connection with them, or with their experiences. She recognized that she was exposed to *'some jokes'*, becoming desensitized to them as she navigated different STEM experiences. She also recognized, within this idea of something not being *'quite right'*, an inability to achieve the level of challenging work that she saw her male-colleagues getting. She was not recognized as the 'Lead', for example, demoted to 'Control Engineer'. Arwyn could not make sense of why she wasn't able to get recognized as the 'Lead', or to get those coveted assignments. She appeared to hold on to the notion that engineering work, in the space industry, was 'supposed to be' cisgender-neutral and merit-based. When faced with the realization that this was not the case, Arwyn was more perplexed and frustrated than anything else. She also pushed aside the centrality of one of her identities, notably her cisgender, as seen in the last story. She repeated a similar stance, that is, pushing aside her cisgender, when I asked her my clearing question:

Interviewer: *Is there anything you would like to add to our conversation that I have not asked you?*

Arwyn: *I'd like to add is that it isn't clear for me if not having been able to find where I belong or make a place for myself is related to being a woman. You know, if I look at my colleagues who are also trying to get [a higher position], they weren't more successful than me. But I would really have a hard time definitely saying that it's because I'm a woman. The sample of women around me might not be big enough for me to systematically say that women have a harder time making a place for themselves. That might be what I want to highlight. It's too easy to say: "I'm a girl, that's the reason". I think it's a lot more complex than that. And it's very subconscious too. I know I'm not a flamboyant person, it takes a lot of effort for me to promote myself, and take my place. It takes a lot of effort on my part. It would take a lot of effort. So, I feel as though some of that also plays a role here, the calmer disposition, more subdued....*

In contrast to this idea of pushing aside her cisgender, Arwyn did spend some time reflecting on cause-and-effect explanations of her daily work life where her cisgender could play a role. In particular, she did try to look at the issue of travel, and whether her cisgender was the issue:

Yes, I'd say that the family aspect came into play afterwards, once I was hired. I think [specific supervisor] had a bit of a strange situation in his relationship, without going too much into his personal experiences [laughs]. But part of him wanted to be sure that it wouldn't happen to us. So, he really tried not to overload us with travel and stuff. I don't know if it was more directed at me, but I know he also talked about it with [Stynir] too, since he had young kids. I don't know if it was more me as a girl with young kids, or if it was more of a general thing for all employees to be aware of the fact that your family life is important too.

In this story, Arwyn attempted to investigate this cause-and-effect relationship. The power-relations and discourses in her day-to-day interactions led her to seek out possible reasons for this treatment for her work experiences. While the attributed anchor point of ‘You are a (lower level) ENG and you travel?’ embraced humor, it hinted at her lower position in the organizational structure and at her cisgender. Her questioning and re-questioning of her cisgender, and its role in her every day, are a symptom of the male-dominated experiences she was exposed to. This mirrors the academic literature, notably Etkowitz, Kemelgor and Uzzi (2000) who found women in male-dominated industries questioned repeatedly why they were there, as I pointed out earlier. Arwyn made sense of her lived reality by embracing beliefs that boiled down to her personality, that she wasn't flamboyant enough or not outspoken enough, to explain away some of the cisgender-effects. At other times, she would gently poke at the idea that it might indeed be due to her cisgender.

Late Career

Desrit

Desrit, as I recreated her in Chapter Six, was a ‘female’, mother, and partner, who was attributed the ‘You are the Only One’, ‘The Mommy’, and ‘Leader of Harem’ anchor points. Focusing on the dominant ideas and practices found across her discourses, via the application of the CSM framework, Desrit talked to her experiences with respect to navigating the masculine and feminine ideals:

I get along well [with] the masculine gender. I often find that I have more conversations with boys than girls. Maybe less as I get older because I had kids, but at the beginning, before having kids, I'd say that I conversed less with girls because... there was no connection. We've had a few girl engineers, but they didn't stay. Perhaps I'm the reason that prevents them from staying [laughs]. We always joke that I keep my harem [of men].

There is a tension, in this story, between Desrit belonging to the ‘feminine’ side, with respect to what her expectations of what the feminine cisgender entails, and to the ‘masculine’ side, captured within engineering male-dominated notions. This tension also reflects her sense of belonging to both the masculine and to the feminine. In other words, the dominant ideas expressed in this story are one of separation across the cisgender ideals, and of bringing two cisgender ideals together. This dominant idea is reflected in all her attributed anchor points also: ‘The Leader of the Harem’, embracing the masculine ideals; ‘The Mommy’, embracing the feminine ideals; and, ‘You are the Only One’, embracing the feminine ideal but also trying to fit in with the masculine ideal. This dominant idea is also evident in other stories she shared during her interview:

Desrit: *I'm happy where I am, and I feel loyal to the people I work with. The only thing I can imagine is that one day, if I'm properly fed up, I might make a quick move and I'd let them figure it out, but I'm not at that point. You know? All things have their end anyways, but when you fight for a group and you decide to leave... in fact,*

when people leave it always affects me tremendously. At one point, I had three consecutive resignations [feminine], and let me tell you, when that third one came in, I cracked. It was the first time I cried...

Interviewer: *Do you want me to turn the recorder off?*

Desrit: *No, no...That's my feminine side coming out. I try to never let it out because...well...it's not easy when people go.*

Desrit struggles across the feminine and the masculine ideals, and what is expected of her. Notably, is she supposed to cry when three people in a row leave? Her particular context of rules and formative contexts tell her that she isn't supposed to be emotional when this happens, to 'never letting it out'. Her 'Mommy' anchor point, which embraces the feminine side of the ideal, also puts this struggle into evidence:

I loved my work as a [technical] engineer. There are days where being a supervisor is rough. Hiring people, evaluating staff, reprimanding the boys because they didn't do things the right way, telling certain people to tone it down, it's not always enjoyable.

Being the 'Mommy' to 'the boys' is never easy. The point though in this narrative is that Desrit struggles across a wish to do the technical engineering work, embracing the masculine roles, but she is forced into 'reprimanding the boys', embracing the feminine side of calling out bad behavior.

As for Desrit's critical sensemaking, and its relationship with her anchor points, the two anchor points, 'The Mommy' and 'Leader of Harem', were addressed within the dominant ideas of navigating the feminine/masculine ideal. I looked then to the broad range of her discourses, including her educational experience, in relation to the 'You are the Only One' anchor point. The following separate stories best showcased the relationship between her sensemaking and this anchor point:

It was clear that my sister and I had to go to university. Ever since I was little, I didn't know in what field, but I was going to university. I went from top of my class

[in high school] to middle of the pack [at university]. For a long time, I wondered what I was doing there and I persevered because I can't just drop something. I finished my program, and continued to wonder what I was doing there. I was stunned that 30 years later... engineering had not evolved more in terms of numbers of girls. I think that it's just not as interesting to women. You see women as the majority in medicine...it's all about interests. When I was young, I was all about science. I'd talk a lot with my Dad, who was big on science, but it wasn't a common interest with my friends.

No one really works alone. You know, when something just isn't working, I can turn to [my boss]. And him, when he's hit a wall, he has no one to turn to...I never feel alone; I always feel well surrounded. I tell myself that I'm good when I go home.

By focusing on her attributed 'You are the Only One' anchor point, her stories about her STEM education underscore her position as the minority in her university engineering classes. To her, though, this minority status was due to interest; other 'girls' were interested in medicine, while she was interested in engineering. She also made sense of this 'You are the Only One' anchor point within the context of her work. She believed that '*no one really works alone*' thereby making it impossible for the 'You are the Only One' anchor point to be accurate. Her boss, after all, is not alone; he can turn to her. This is an interesting empirical turn to a resistance discourse, showcasing the impact that sensemaking can have with respect to attributed anchor points.

Vigrine

Vigrine's interview was extensive, and, as a result, there were many dominant ideas and practices to consider. Recall that I recreated her, via the application of the CSM framework to her transcribed interview data, as a woman, mother, and partner, who is passionate about STEM and teaching. Her attributed anchor points consisted of being 'On Probation', 'Like a dog', 'You don't have a PhD and you're an 'old' woman, you are worthless', and 'How can we count on you? You're a woman, you have kids'. With

respect to her many dominant ideas and practices, I decided to focus on one of these dominant ideas, namely on the program called ‘*La Relève*’, and the hiring processes involved in this program. I chose this particular idea, over the others, as it continues to showcase some of the ‘inhuman’ pool hiring rules, presented in Chapter Seven, and the outcomes of the application of these rules in this industry:

There was a call at the [specific organization], looking for those who wanted to be a director. So, there was a call placed by the Vice President [female] to find those interested, and she wrote: “We would like to see as many women as men”. So, I participated. I wrote the application, I am selected. There was then an exam. I passed the exam. There’s a second exam, and I passed that too. There’s something else but I can’t remember, and, at the end, there’s the [specific] exam where you do the interview... There were eight of us in total in the pool who did the interview, with the psychologists and everything, two women and six men.

One of the three exams went really poorly. It was two full days, and one portion went horribly, and it was the interview, me with two psychologists, one of whom was an employee, and the other was a psychologist, and the employee was talking to me, and I was the manager. I met with one of the psychologists who explained to me where I failed. The psychologist told me in the debrief: “Look at how nervous you were. So, it’s a sign that you cannot be a manager”. I was really shaken. I was so shaken.

I watched the four boys who made the cut, and I am still upset about that. One of them became director, and [he] is now on sick leave. It’s going so horribly [for him] that it’s not even funny. Two of them never became directors: one of them said: “No, thank you”. And the other said: “No, thank you”. And the last one was made director, and was then fired. Sorry, he was thanked during another [one of our] reorganizations.

The dominant idea, showcased in these stories, was this notion of navigating ‘emotions’. She was ‘just’ being human in an interview process that most, if not all, would acknowledge is a stressful process. The psychologist was, surprisingly, in essence telling her during the debrief to embrace a ‘masculine’ ideal of showing no emotions. As the evidence shows, however, this notion of embracing the ‘masculine’ ideal of having no emotions was to the detriment of the two men who were successful in this process.

Notably, one man was on extended sick leave, due to ‘burn out’, while the other was fired. When I superimposed the attributed anchor point of ‘How Can We Count on You? You’re a woman, you have kids’, I can’t help but think that Vigrine may very well have been the one to be counted as the viable candidate, in this ‘inhuman’ hiring pool process. because she is actually ‘human’, for showing her nervousness, and that she was not scared to show her emotions. The first man who is on sick leave is done, in the end, a disservice: he may have met the requirements of ‘inhuman’ rules, his humanity came back, and caused him considerable grief.

With respect to Vigrine’s critical sensemaking processes and a relationship to her anchor points, I decided to focus once again on the ‘You’re like a dog ... You need to be kept on a leash’ anchor point. As I have highlighted in the previous chapters, this attributed anchor point permeates all her stories and narratives. This anchor point also provides a symbol of what is wrong with adopting such destructive discourses in the larger context of meanings. I focused on Vigrine’s discourses concerning the end of her career, as a way to showcase the insidious nature of this anchor point, and her beliefs and actions surrounding this attributed anchor point:

I feel that I was used. They will take a lot. I think I have a good head on my shoulders, but I was used. I was obviously consenting, but it’s also obvious that I didn’t do all this for nothing. So, for me... I was [all for] science. I know I’m not an engineer, I know it’s best for me to talk science than to talk technology, except that I’ve worked in science, I’m trained in science and technology, I’ve taught science and technology. So now science, at work, at the [specific company], who takes care of it?

I’m at the end of my career. My chances of being a manager at the [specific company] are near-nil, chances of being director at the [specific company] are nil. I can hold my own in a [hiring] competition, but it would take a willingness on behalf of the [specific company] to name someone like me. And before naming me, they would name an engineer [female] because that’s something else that works against me - I’m not an engineer in a box of engineers. One of my colleagues [male] said: “I don’t know why

you don't go back to school to become an engineer". That's how we solve problems... So that's pretty much it for my career. It's a bit of the end of the road for me. It's like, what am I going to do?

So, I'm a bit of a defeatist at the moment. I'm a bit stuck on: "I learned the ropes, I have a lot to offer", but at [specific company] it's: "No, not you, I don't think so", and "It's not personal." It's not personal?! ... There have been times when it was because I was a woman, and there were times when it was because as a woman I did not get the opportunities. The time they said: "No, we won't train you to be director" What a mistake! What a mistake! Can you imagine that I wouldn't be at least as good as [Man #1]? As [Man #2]? As [Man #3]? My dog has died.

Vigrine's beliefs and actions, as put into evidence in this sequence of different stories, showcased that she could not escape the attributed anchor point of being 'A Dog on a Leash'. The issue, as she saw it, was that through her desolation and her defeated status, all she saw was that her '*dog has died*'. She left me with this image of a dog on a leash, lying on the ground with no fight left, letting others walk all over her. I also retained that Vigrine's critical sensemaking, influenced by her prior experiences, social interactions, retrospective processes, and power-relations (Helms Mills, 2003), led her to the conclusion that she had no place in this industry, as a woman and as a scientist in the male-dominated, engineering-focused space industry. That there is a relationship between this anchor point, a symbol of utter defeat, with her critical sensemaking processes is undeniable: Vigrine's '*dog has died*', and so she counts down the days until her retirement, until she can leave this industry. I fear for her, though; when retirement does come, will she be able to walk away from this 'Dog on a Leash'? Importantly for this study, the impact of this attributed anchor point, and Vigrine's critical sensemaking processes related to this poor 'dog', showcases the utter destruction of a woman who is a passionate about science and teaching. This is what Othering, over a long career, can do in this particular industry.

Inenya

Inenya self-identified as a single parent who is fierce. She also was attributed the ‘Girl Engineer/Only Girl Here’, ‘Girls don’t do Anything’/ ‘Is She Supposed to be Here?’, and ‘The Secretary’ anchor points. I focused the analysis on the dominant ideas surrounding two of these anchor points, namely the ‘Girl Engineer’ and ‘Girls Don’t Do Anything’/ ‘Is She Supposed to be Here?’ anchor points, because, so far, none of the participants in this study shared their inspiration for working in the space industry. This is an important focus, as many of us come to this industry because of a passion for doing science/engineering/tech in space. Inenya was the only participant in this study to identify that she did NOT notice that she was a ‘Girl Engineer’ in a sea of all men engineers at university. Inenya’s first dominant idea was then this notion of her interest in space, and her experiences during her engineering studies, as represented in the following two independent stories:

I grew up in Houston. And my back door – off my back door – was NASA. So, like I remember the moon landing. You know, I got to stay up late. I don’t remember much of it, other than the [makes sound effect of the Apollo landing,] and grey fuzzy stuff, but I got to stay up late. And so that was really cool!

In school, I was always interested in the maths and the sciences, not the languages. I liked the arts... My brother...was the one who turned me on to mechanical engineering. And so, I – when I went through high school, I kept to the maths and the sciences, took all the advanced classes, and physics and chemistry, and all that sort of stuff. And then, I applied to the university there that he went to, which is a really good engineering university. I went for mechanical engineering, and we were a graduating class of about 35, five girls and the rest guys. No, that’s not bad at all. For this – this was in the 80s! Our class was small. Like I said, in university, everybody knew everybody else, and then when I started working, I was on a test team, and there were other [women], you know... so, I never even considered the thought that I was unusual...

Many people witnessed and were inspired by the Apollo landing on the moon (De Groot, 2006). Inenya, thankfully, shared this experience with me, and how this event preceded a conversation with her brother about possible future STEM educational pursuits. That there were five ‘girls’ in Inenya’s graduation class, in mechanical engineer in the early 1980’s, is impressive. Inenya being a ‘Girl Engineer’ did not become an issue until later in her career. In other words, Inenya was not attributed and did not recognize the ‘Only Girl Here’ anchor point during her education and, I might add, during her early STEM career.

Moving to Inenya’s next dominant idea, she navigated throughout her career a number of cancelled programs/divisions/companies:

We went from two program managers, two project engineers, and a project assistant, to me as project manager, project engineer, and half of a project assistant... So, after about a year of that I was getting burnt out. I was working so many hours and just completely...my friends were saying I couldn’t have conversations anymore because I couldn’t speak of anything other than work. I knew nothing that was going on in the world... So, I had – that’s when I quit. Then, I was at [another specific company]. I was at [this company] for six years, I think, and then the whole thing fell apart. I was one of the – I was held back...I was designated a critical resource until they eliminated the whole department. So, I lost my job in 2002. I was laid off.

This dominant idea, in relation to Inenya’s attributed ‘Girls Don’t Do Anything’ anchor point, highlights once again that she went above and beyond what would be considered a healthy, or ‘normal’, work load. She recognized, along with her friends and family, that she was hyper-focussed on her STEM work. This is, I might add, a red flag that something is amiss in someone’s life if all they can focus on is work. This reality also demonstrates the absurdity of the attributed ‘Girls Don’t Do Anything’ anchor point in Inenya’s case. The tension between this dominant idea and this anchor point underscores

that STEM-professional women tend to take too much on; this was seen, in this study alone, in Geirit's and Arwyn's analysis results.

The next dominant idea, lack of career progression, is ironic in light of taking on too many responsibilities in an industry that sees high turnover of projects/programs, as Allan (2004) and Lang et al. (1999) pointed out. Inenya, as she shared in the following narrative, was very much aware of her stalled career:

[I was] acting as the systems engineering supervisor for like sixteen months, and there was a period there that I was doing it, and I wasn't being recognized as a [senior] ENG. Kind of like – remember [specific female colleague]? You know, four years [acting] in that role and... and why isn't it [the position] just given to her?! So, it's been in the last about three, four, maybe even five years that I've just gotten very frustrated with no [career] advancement. I've done the leadership training... I got accepted as one of the candidates for the [specific training course in] leadership. I... you know, I've done acting positions... and I'm in the [specific hiring] pool for program management, for program managers.... But it's like you don't move. It's 2016, and I'm exactly where I was in 2003!

This dominant idea weaved its way into much of her stories and narratives during the interview, showcasing her frustration. In contrast to Vigrine's defeated stories, Inenya's stories were more akin to a cauldron ready to boil over. As for the relationship of this dominant idea with the attributed 'Is She Supposed to be Here?' anchor point, it is plausible to argue that she did indeed belong in the space industry. Her cauldron of frustration can be viewed as a resistance discourse with respect to this question of her belonging in this industry.

Moving to Inenya's critical sensemaking processes, I focused on the 'Only Girl Here' anchor point in order to consider her late career experiences. The following three independent stories foreground her processes:

I've just gotten to a point where I'm old enough now that I'm disappointed. I'm just going to focus on the things that make me happy. I'm disappointed with people for not having those opportunities not to move up. I'm disappointed with the organization staying the same, not really changing. Yeah, maybe our processes have changed, but it has nothing to do with the people.

I don't think I'm going to – you know - I'm going to continue to support the [specific women's committee] and any of the [other] initiatives. I don't think the older generation really thinks or cares about inequalities...but like I said, you look at any other statistics, and you start breaking down the statistics on where it is, there's a real gap of women in [engineering] fives and sixes, which are a stepping stone into executive [positions].

I realized that we're going to continue to do things exactly the way we've been doing them. No matter how much we talk about change, we're going to continue to do it the way we've been doing it, because the people who are making these decisions are the exact same people. It's that same thing. You bring in what you know – you bring in the same person. So, I don't see revolutionary change in this field. No matter what, you know, somebody says, it's... we're going to continue down the road of being behind.

Inenya made sense of her social reality in the space industry, changing her focus from helping women in the STEM professions to focusing on what makes her happy. To this end, she had decided to not offer support to various initiatives on moving women up into management within the space industry. She also no longer believed that change was possible in this industry, let alone “*revolutionary change*”. To a certain extent, she is mirroring Ormyr’s discourses, presented in Chapter Seven, that the only solution to this problem of lack of women in management was due to the ‘*old White men*’ being in power. Inenya believed that the status quo would remain as it is, and she would continue to be the ‘*Only Girl Here*’. These late career discourses are significant when I considered them in contrast to her embracing masculinist discourses, such as the perfect target and the whip, at the beginning of her career. While Vigrine’s discourses were clearly defeatist ones, Inenya’s were more expressions of disappointment and frustration. I am underlining

this contrasting sensemaking process to show that while the late career women all had the same attributed anchor point, of ‘The Only Girl Here’, there are different relationships between each of their sensemaking processes and this anchor point.

Summary of Relationship between Anchor Points and Discourses and Critical Sensemaking Processes

I considered, in Chapter Six, RQ1, identifying the range of anchor points for each STEM-professional woman. In Chapter Seven and Eight, I studied the relationships between this range of anchor points with rules and formative contexts, dominant ideas, and critical sensemaking processes. The table below summarizes the findings presented in this chapter with respect to answering the remaining part of RQ2.

Table 6: Summary of Dominant Ideas, Critical Sensemaking Processes, Meta-Rules/Rules, Formative Contexts, Anchor Points

Career Stage	Participant	Dominant Ideas/Practices	Critical Sensemaking	Meta-Rules and Rules	Formative Contexts	Anchor Points
Early Career (under 5 years)	Geirit	Merit and skills carry her work, not her 'female-ness' social-identity "I'm long term single" self-identity	Resistance Discourses: 'Females are More Serious' = 'just ridiculous' 'Technical Lead' = skills/merit Cisgender beliefs in 'reasonable' progression: from technical skills and merit, to being 'The Leader', and then onto Manager	program/project cancellations meta-rule demarcation between program and functional management meta-rule demographic rule: 'standard' rule of 20% cisgender structures rule	Old Boys Club values: " <i>behavioural modifications</i> [of men]", women expected to 'fight back', and questions as to "why is she here?" Pornography in the work place as a social value controlling space structures and women: " <i>the big boys</i> "	'The Leader' 'The Bitch' 'Females are More Serious'
	Eliya	Deferring career moves due to emotional attachments to her boyfriend	Unstable context = wish to ' <i>discover new things</i> ', and plan to take ' <i>some sabbatical leave to travel</i> ' Resistance discourse = 'devil may care attitude' which protects her identities Men can yell at her because: (1) she is a girl; and, (2) as a girl, she is asking too many questions/she did not have the experience to 'know' what she didn't know. Also, she is 'The Only Girl' who is 'Not Very Serious' so she must navigate this cisgender process	education elite rule the only girl here rule being put in her place being adaptable as a rule demographic balance rule	'elite' education/ work women are targets for men's teasing, and are there to be admired trust value in the interview process adaptable value	'Elite' 'Not Very Serious'/ 'You're So Funny' 'The Only Girl'

Career Stage	Participant	Dominant Ideas/Practices	Critical Sensemaking	Meta-Rules and Rules	Formative Contexts	Anchor Points
Mid-Career (over 5 years but under 15 years)	Arwyn	Her search to 'find herself' Cisgender pursuit of higher education	something isn't 'quite right' felt no connection with other STEM-professional women or their experiences desensitized to 'some jokes' could not make sense of why she is demoted to 'Control Engineer' pushing aside vs embracing her feminine cisgender questions the cause-and-effect relationship of her feminine cisgender	'more human' interviews vs 'inhuman' pool hiring rules cisgender multi-tasking cisgender presentism cisgender taking unwanted jobs masculine cisgender ideal of ordered assignment	no value assigned to cisgender multi-tasking cisgender winning award masculine, aggressive 'pulling all aces' value, versus feminine 'acquiescing'	'You are a [junior] ENG and you travel?!' 'Control Engineer' 'Time to Move On'
Late Career (over 15 years)	Desrit	Navigating across the feminine and the masculine ideals	'it's all about interests' = making sense of lack of women in university engineering struggle to make sense of navigating masculine and feminine ideals 'No one really works alone' = interesting resistance discourse to an attributed anchor point	cisgender stratification in engineering and in military supervisor is trusted to hire person she/he needs as a rule <i>Order of Engineers</i> (external environment) constraint	feminine ideal is represented by secretaries as a value military, male-dominated in space values trust value	'You are the Only One' 'The Mommy' 'Leader of Harem'
	Vigrine	'Inhuman' hiring pool rules versus exhibiting 'human' emotions	Symbol of a dog on a leash, lying on the ground, with no fight left, letting others walk all over her Utter destruction	cisgender taking unwanted jobs contradictory occupational position	lack of cisgender awareness social value: "cultural blockage" embracing feminine values: helping others, nurturing/ motivating	'On Probation' 'You don't have a PhD and you're an 'old' woman, you are worthless' 'How can we count on you?'

				<p>cisgender rule of ‘having the balls’ to win the hierarchical game</p> <p>limits of Human Resources: confusion re Employment Equity and Canadian Human Rights Act contradictory occupational position</p> <p>limits of Human Resources: confusion regarding meta-rules of Employment Equity and Canadian Human Rights Act</p>	<p>navigating masculine values: ‘vulgar’, ‘very direct’, ‘the balls’, dismissive</p> <p>embracing more masculine values: confrontational, hierarchical ideal of change</p>	<p>You’re a woman, you have kids’</p> <p>‘You’re like a dog ... You need to be kept on a leash’</p>
	Inenya	<p>Inspired by the Apollo moon landing</p> <p>Not aware of being a ‘Girl Engineer’ or ‘Only Girl Here’ in her education or her early career</p> <p>Taking on too many responsibilities</p> <p>No career advancement</p>	<p>Changes her focus from helping women, to now focusing on what makes her happy</p> <p>No longer offers support to various initiatives on moving women up into management</p> <p>No longer believes that change is possible in this industry</p> <p>Frustration</p>	<p>engineering work ethic</p> <p>late career: no trust</p> <p>‘inhuman’ pool hiring</p> <p>infantilizing STEM-professional women at work</p>	<p>early career value: diversity</p> <p>masculine engineering values: elite, perfection</p> <p>resistance: working-in-the-trenches, value, more realistic values re perfection</p> <p>‘humans’ are not valued</p>	<p>‘Girl Engineer’</p> <p>‘Girls Don’t Do Anything’/‘Is She Supposed to be Here?’</p> <p>‘The Secretary’</p>

The reproduction of the six STEM-professional women, as reflected in Table 6, captures not only the complexity of each individual in a particular social reality. I have also showcased a representative set of discourses focused on identities, and their relationship with rules and formative contexts, dominant ideas, and critical sensemaking processes. An individual was defined as being constructed via their self- and social-identities, and their anchor points, and that this individual is in a state of being, and of becoming, that is self-regulating, influenced and limited by such systems and processes as rules and meta-rules, and formative contexts. She is also conforming and responding to discourses and power-relations of the every day. She responds to the creative needs of these mundane interactions via critical sensemaking processes. This individual, via her beliefs and her actions, has the potential to exercise micro-political forms of resistance (Davies & Thomas, 2004; Hutton, 1988). She is then conforming and resisting, self-creating and created by others, dominated and dominating into a meaning-giving and meaning-making self. With these findings in mind, I now consider the third and final research question, RQ3: how do anchor points influence the STEM-professional women's exclusion from management positions in the space industry?

The 'How' of Exclusion: The Influence of Anchor Points

Given the construction of the complex individual, I can now emphasize that the range of attributed anchor points is not 'just' an issue of name calling, or of stereotyping, an individual. Attributed anchor points can be productive (e.g. 'The Leader') and/or oppressive (e.g. 'You're Like a Dog'). They can be accepted (e.g. 'Elite') and/or resisted (e.g. 'Females are More Serious'). They can reflect a need to categorize the social (e.g. 'Not Very Serious', 'The Mommy') or to undo the social (e.g. 'Time to Move On'). As

for the influence of the range of attributed anchor points on exclusion, I return to the definition of exclusion based on Yuval-Davis' (2006) work that I presented in Chapter Four. Her argument, surrounding exclusion, was built around social division, identity categories, and an individual's subjective experience of their daily life. Specifically, she broke exclusion down to 'normalcy', where "determining what is 'normal' and what is not, who is entitled to certain resources and who is not" (Yuval-Davis, 2006, p. 199). Cisgender, race, ethnicity, class, age, able-bodiedness and many other identity categories that are discursively (re)created to divide individuals along two groupings: 'us' and 'them'. In such a system of division, we can talk about exclusion regardless of how many individuals are impacted by this experience. What is key to understanding this 'us' and 'them' argument, is the critical elements of cultural, political, and historical influences on social divisions that must be accounted for and recognized. This construction necessitates power-relations that are involved in social divisions, which is above and beyond a simple listing of identity categories, and how many individuals are or may be affected (Yuval-Davis, 2006).

This construction of exclusion embraces all three of Foucault's modes of domination: scientific classification, dividing practices, and subjectification. So, within the embodiment of attributed anchor points, I reconstructed these three Foucauldian modes of domination, harnessing power-relations and discourses, along with contexts and critical sensemaking, to showcase the complex reality of 'us' versus 'them'. For example, Vigrine's case in particular stands out: she had been classified as a 'dog' that needed to be kept on a leash, she was divided from those who had PhDs, and she was decimated into the Other. To be clear, the experience of exclusion for these STEM-professional

women is much more than ‘just’ being called a ‘dog’, in Vigrine’s case, or of being ‘The Only Girl Here’. The attributed anchor points reflect the exclusionary social reality that these individuals experience on a daily basis, where Vigrine, for example, is a dog (i.e. ‘them’) while the other woman who attributed her this anchor point is among the ‘normal’ (i.e. ‘us’). The influence of anchor points on exclusion is not a cause-and-effect relationship although some of the participants in this study tried to look at their exclusion in this way. They are rather a mirror on a particular time and place of social interactions, among a variety of individuals, within a context of meta-rules, rules, and values, that they make sense of and reflect in their dominant ideas.

The attributed anchor points, across the spectrum of power-relations that I showcased in the three analysis chapters, are an unstable branch of social-identity. The individual can be reconstructed via these unstable anchor points, their self- and social-identities. The ‘Girls Don’t Do Anything’ or ‘Is She Supposed to be Here?’ or ‘You’re like a dog’ anchor points, placed into a social reality, and subject to critical sensemaking processes, not only reflect the experience of exclusion, but also shine a light on the experience of exclusion. Anchor points offer a momentary ‘snapshot’ of time and space, and thus bring forth an understanding of power-relations and discourses within a specific social reality.

Feminist functionalist approaches would have a hard time considering these varied and extensive power-relations, with their search for objective and unitary ‘truth’ (Hawkesworth, 1989). Feminist standpoint-based research would valorize a woman’s (class, race, cisgender, etc.) difference, and use these differences as a mode of resistance (Hekman, 1999). However, as I pointed out in Chapter Three, I am not striving for economic determinism as many standpoint-feminists do. Some standpoints feminists

ignore subjectivity and the interactions between individuals, while I integrated social interaction throughout this research initiative.

Within intersectional feminism, based on a poststructuralism perspective, an individual is no longer considered as a unitary ‘woman’, representative of all women. This intersectional feminist construction of a ‘woman’ is fractured and fragmented, a subject of the power-relations and discourses that are at play. She is both in a state of being and of becoming. There is no longer a universal ‘truth’ that is woman, and so there is no longer a universal victim to power and hierarchies. ‘Woman’ is discursively produced and reproduced via identities based on individual difference and domination. This construction of an individual opens up an important area of discussion with respect to micro-political resistances (Davies & Thomas, 2004). This area can be used to showcase how each STEM-professional woman can choose to address dominant discourses and power-relations. I turn now to these micro-political resistances as a way to further showcase the influence of anchor points on exclusion.

Sites of Micro-Political Resistances and Social Change

The reconstruction of the STEM-professional women in this study was premised on looking at the discourses of everyday, mundane interactions. All six STEM-professional women who participated in this study were in a state of being and of becoming, as reflected in their respective identity maps found in Chapter Six. These identity maps provided a visual framework of these women’s interdependent and constituting identities, foregrounding the STEM-professional woman as an individual who was subject to, and a participant in, her state of becoming the Other.

The STEM-professional woman was, clearly, a participant in the web of day-to-day interactions. As such, she had a suite of possible reactions to the attributed anchor points, within her context of rules and social values. She could, for example, recreate limits and boundaries in her dominant ideas, thus mirroring her particular oppressive power-relations. The oppressive power-relations were most clearly reflected in some of the late career participants discourses. In particular, Vigrine and Inenya seemed to accept their oppressed state in the Canadian space industry, re-using attributed anchor points throughout their discourses (i.e. 'My dog has died', 'Girl Engineer'). Arwyn, the lone mid-career participant, also reflected her own brand of oppressive discourses, wondering 'who I am', and believing it was 'Time to Move On'. Within the group of the early career participants, they appeared to resist their attributed anchor points (i.e. 'that's ridiculous', 'I'll just go on vacation'). However, I cannot ignore that there was evidence that these early career participants exhibited ignorance with respect to their oppressed state (i.e. 'no training for management... but I'm being trained for technical lead position', 'being teased', 'objects' to be admired). Perhaps, most disturbingly, one early-career participant, Eliya, somehow made sense of being yelled at via her 'girl-ness', and her inability to be 'serious' (i.e. 'If I were more serious, then he wouldn't yell at me').

Desrit's case with respect to possible sites of micro-political resistance is important to consider independently from the other participants. Her context of rules and values are different than the other participants in this study. Most importantly, Desrit's context included values of trust while still having to navigate military, male-dominated rules and values. I also have to underline that she did state a number of times during her interview that 'I am happy where I am'. No other participant made such statements. In addition,

Desrit did acknowledge her own struggles with her feminine side, in light of the masculine environment she found herself in. This struggle was reflected in a number of ways, including her emotionality during the interview.

Social and cultural change is not easy or straight forward to implement. Given the findings of this study, there are specific sites of micro-political resistances that can be used by these and other STEM-professional women to effect social change. With respect to the early career STEM-professional women, they would benefit from a better understanding of the long-term impact of everyday discourses. They also need assistance in understanding how to untangle power-relations of the everyday. By being aware of these power-relations, it would address the ignorance of their state of being, allowing them to integrate new processes into their making sense of unacceptable discourses in the workplace. These early career-professionals could also benefit from a better understanding of how making sense of the everyday can have the potential to hinder them, and their careers in the long-term. As for the mid-career STEM-professional woman, they can similarly be guided to resist their attributed anchor points (i.e. ‘I’ve asked him whether I’m incompetent, no good’, ‘I think the value I bring is good, but I’m often given back up’). Micro-resistance lies in first identifying the anchor points, and then looking at the making of sense of these attributed anchor points. Entering into a conversation with those who attributed the anchor point is a good first step.

As for the late career STEM-professional women, Inenya in particular showed that she can initially resist the attribution of anchor points (i.e. through humorous uses of the ‘evil twin’). Desrit also resisted some of her anchor points, via such things as the appropriation of the masculine ‘harem’ for her own purposes. However, Desrit had the

trust value working in her particular context, and this becomes a harder value to infuse into other organizations. Being first aware of this value, perhaps, becomes an important impetus for social change. Some activities that could help these late career individuals include group meetings, supported by a mediator, who can untangle their discourses, and their acquired/internalization of dominant ideas and practices. Similarly, management and human resources personnel need to study their 'inhuman' pool hiring practices. The reality is that each individual is, actually, human and we need to treat them as such. There also needs to be acknowledged movement away from forcing individuals into fitting into a masculine or a feminine ideal. The discourses focused on cisgender women into either ideal, coupled with the dismantling of cisgender rules and values that place feminine attributes below those of masculine ideals, also need to be dismantled.

Conclusion of Exclusion Experience

The discursive limits and boundaries put into evidence in this study were reflective of one possible 'how' of the exclusion of STEM-professional women. Each individual experienced being, and becoming, the Other within the social reality of 'doing space' in different ways. The narratives and stories showcased a spectrum of productive and oppressive power-relations that could not be broken down into binary 'black-and-white', 'men versus women' exclusionary experiences. For example, Vigrine managed to maintain a 'love' of science and of project management while continuing her efforts to seek new opportunities to learn, in spite of her exclusionary experiences at the engineering/science/woman /older/mother identity intersections. Vigrine clearly shared oppressive discourses with me, notably of being 'defeated' and 'my dog has died'. She was able to navigate these productive and oppressive power-relations, and their power-

effects, oscillating between them throughout our interview. Specifically, she would become visibly emotional when recounting her dominant idea surrounding ‘*La Relève*’ while also becoming excited about certain missions and her accomplishments in those missions. Vigrine’s state of being, and of becoming, the Other was a mix of productive and oppressive processes. While I’ve focused on Vigrine’s case in this conclusion, the remaining five STEM-professional women’s experiences are just as worthy of individual consideration. Their exclusion experiences were also a mix of productive and oppressive processes, extending the understanding of this spectrum.

It is noteworthy that the men and women in the Canadian space industry who attributed these six STEM-professional women’s anchor points were similarly subject to rules and formative context, dominant ideas and critical sensemaking processes. They are, just as the six STEM-professional women in this study, clearly in a state of being and of becoming. I did not set out, however, to determine why these individuals would say such things as ‘The Bitch’ or ‘You’re Like a Dog... You Need to be Kept on a Leash’ or ‘How Can We Count on You? You’re a Woman, You Have Kids’. What I did want to bring to light was the disciplinary power-relations involved in the experience of exclusion. Exclusion, as I showed empirically in this study, was not ‘just’ an issue of binary relationships, of men versus women. The ‘how’ of exclusion is much more complex than these simple types of relationships. As I have shown, exclusion can be brought forward by investigating stories and narratives focused on identities, rules, meta-rules and formative contexts, dominant ideas and critical sensemaking processes. Inenya, perhaps, best characterized these discourses and these relationships as the “*silent killer of female careers*”.

The work of change rests with every individual in this context of ‘doing space’. Attention to everyday discourses and power-relations along with a closer examination of rules and values that are, in some cases, ‘inhuman’, and cisgender, must be dismantled if we are going to continue to reach for the Stars in a productive and enlightened fashion.

Chapter 9: Conclusion

This study began as a voyage of discovery designed to unravel the ways that STEM-professional women are excluded from management positions within the Canadian space industry. The theories and concepts used to address this systemic discrimination were premised on intersectionality of identities. Specifically, I reworked and applied the notion of anchor points, within the context of meta-rules, rules, and formative contexts, and the individual's critical sensemaking of stories and narratives. Furthermore, the need for social change in this Canadian industry was premised on identifying sites of micro-political resistances for these STEM-professional women.

This chapter addresses the contributions and limitations of this thesis. I consider what contributions I make with respect to the academic literature, and to practitioners. I also consider the contributions I make with respect to development of theory, to the CSM methodology, and to social justice. I then consider the limitations of this study, and the implications for further work. I close this chapter with a final word on my journey.

Contributions to the Literature and to Theory

This research was positioned within the theme of social constructionism, critical management, and intersectionality, as a sub-field of the cisgender and diversity literature, following Metcalfe and Woodhams' (2012) heuristic. Given this positioning, the contributions I made are two-fold: one academic-based, and the other academic/practitioner-based.

With respect to the academic literature, I was able to represent the complexity of an individual via her self- and social-identities as well as her ephemeral, attributed anchor

points. I also layered onto this centrality of identities the rules, meta-rules, and formative contexts, and their relationship with the attributed anchor points. Furthermore, I looked at the relationship between these anchor points and forms of experience, notably dominant ideas and practices, critical sensemaking processes, and exclusion. In this way, I added a more complex facet to organizational diversity and cisgender scholarship that others working in this field noted was missing (Cho et al., 2013; Crenshaw, 1991; Davis, 2014; Ko et al., 2013; McCall, 2005; Thomas & Davies, 2002).

Another contribution that I am making, within the academic diversity and cisgender literature, is the consideration of the privileged individual and her exclusion. The STEM-professional woman, as Powell (1999) argued, enjoys a privileged economic status with a level of autonomy and freedom. She also faces high job demands given this knowledge occupational role (Karasek & Theorell, 1990). Much focus within the intersectionality literature has been given to the marginalization of under-privileged individuals, for example, Black women who are neither highly educated, or financially secure, and who often have limited autonomy and freedom with respect to their occupational positions (Corlett & Mavin, 2014). One implication from research focused solely on under-privileged individuals is the perpetuation of a belief that privileged individuals, such as STEM-professional women, could not possibly be discriminated against. This research clearly does not fall into this category; I showcased the exclusionary experiences of these STEM-professional women. I expanded our knowledge of intersectionality with respect to privileged individuals who can, indeed, be discriminated against. I am therefore adding to our understanding of discrimination across a multitude of individuals (Nash, 2008),

and capturing the experiences of individuals in this industry that, to date, are few and far between (Ko et al., 2013).

The interactions of individuals in their everyday, and the power-relations involved in those interactions, are of central importance in this study. The intersectional feminist positioning, used in this research, was not applied in the sense of First-World, ethnocentric feminism, with a binary categorization of men versus women. I was not, also, striving for assimilation of women into the dominant group of men. From an ontological perspective, by embracing intersectionality via a reworked anchor points concept, I am contributing to seeing the world in a different light; discrimination, marginalization, and exclusion are no longer ‘just’ a woman versus man issue. There is an operational mechanism, via the anchor point concept, to acknowledge a complex state of being. Specifically, by taking a closer look at the Glenn (2004) relational concept, I pushed aside the perpetuation of binary relations, allowing for power-relations to be the central issue. I offer a new narrative based on problematizing the power-relations and discourses, that creates and recreates an individual via her attributed anchor points.

Still within this notion of the ontological being, I considered Foucault’s philosophies and technologies surrounding the self and subjection. Imbedded in Foucault’s teaching is the Foucauldian ‘subject’ which was defined earlier as exposed to “...someone else by control and dependence; and tied to his own identity by a conscience or self-knowledge” (Foucault, 1982, p. 781). Furthermore, I showcased that Foucault does not believe in a sovereign, stable, essentialized subject. He believed that the subject was constituted through practices of subjection, of liberation, of liberty based on a number of rules, meta-rules, values, and morals (Foucault, 1988b). The anchor points concept takes these ideas,

melds them together, and builds on them. Specifically, anchor points exist across a spectrum of power-relations and reflect the notion of unstable identities. Anchor points can be many, and each one in that range can be attributed by others. While Foucault talked to the subject's 'own identity', which I interpreted as a self-identity, anchor points are an extension of social-identities. As such, anchor points are not 'just' linked to the individual "by a conscience or self-knowledge" (Foucault, 1982, p. 781); anchor points are in a relationship with rules, meta-rules and social values, along with the experiences of discourses, critical sensemaking and exclusion. Furthermore, Foucault did not address succinctly the cisgender subject; I looked specifically at, and exposed explicitly, cisgender power-relations in the construction of anchor points. The attributed anchor points of 'Girls Don't Do Anything' or 'Is She Supposed to be Here?', are just two such examples, that demonstrated how the cisgender subject can be brought forward.

From an academic/practitioner perspective, this research can assist the diversity literature to move beyond that of the utilitarian/functional, and equality diversity definitions (Simons & Rowland, 2011). These equality and functional/utilitarian diversity definitions have been used by academics and industrial practitioners alike as justification for diversity management initiatives. More specifically, functional/utilitarian diversity is concerned with organizations gaining efficiencies, and increasing effectiveness, towards achieving increased organizational performance (Simons & Rowland, 2011). This mega diversity discourse, so named by Zanoni and Janssens (2015), is mostly focused on socio-demographic groups, that is, in Canadian's legislative terms of visible minorities, Aboriginals/First Nations, persons with handicaps, and women. Equality diversity, on the other hand, is defined as diversity based on morality, and a person's intentions/behaviors

(Van Dijk et al., 2012). This meso-discourse of diversity (Zanoni & Janssens, 2015) often privileges equality ‘experts’, and are similarly often supported by the meta-rule of the *Canadian Human Rights Act*. This study, into the mechanisms of power-relations and discourses, goes to the heart of the issue with respect to exclusionary processes; that is, looking at social interactions, and privileging them when considering cisgender and diversity. This approach allows industrial insiders an avenue to effect social change in the workplace. By looking closely at discourses, critical sensemaking, rules and formative contexts in the everyday, I am recommending that instead of ‘measuring’ diversity, or equality outcomes, we need to focus on power-relations.

Contributions to Methodology

The STEM-professional woman, within the Canadian space industry, has an extensive possible range of anchor points. This range of anchor points and their relationship to rules, meta-rules, and formative contexts, and to experiences of discourses, critical sensemaking, and exclusion, was a daunting task. The critical sensemaking framework provided me with a way to look at all these moving parts together, by first untangling them into three forms: context, knowledge, and experience. CSM has an untapped potential and, with this study, I demonstrated its robustness, and its empirical applicability.

I did explore CSM in some complementary research initiatives (e.g. Ruel et al., 2018) to gain a better understanding of this methodology. I learned a great deal about the confusion surrounding CSM, via the reviewers’ comments, and I tried to address those points here in this thesis. Notably, some reviewers were confused as to whether there was a specific order in applying CSM. I found that there was no need for an iterative – first,

second, third – step function in applying CSM to data. I could easily work with the relationship between anchor points and critical sensemaking, independently from whether I was examining the relationship between anchor points, and rules and formative contexts. I also tried to layer my findings iteratively by summarizing in each of Chapter Six, Seven, and Eight, the various anchor points, and then their relationship with rules and formative contexts, and dominant ideas, and critical sensemaking processes. In this way, the reader was invited to discover knowledge one or two concepts at a time, as opposed to being bombarded with findings all at once.

Contributions to Social Justice

Intersectionality has a multitude of possible understandings to what it is, and what it is not. One issue that carries across all these possible understandings is the question of critically addressing social justice. The scope of this research was such that I could not address extensively how to effect social change in the case of STEM-professional women's exclusion from management positions. I was able, though, to briefly address what could happen following along the lines of sites of micro-political resistances.

I am a strong believer in if you don't know what the problem is, you cannot possibly come up with an appropriate solution to that problem. Unfortunately, many diversity and cisgender policies, and legislations, are put in place without fully understanding what the problem is in the first place. This study was focused on identifying the problem, within the experiences of STEM-professional women, in the Canadian space industry. As I have untangled the problem and clearly identified specific areas to focus on, power-relations, discourses, rules and formative contexts, dominant ideas and critical sensemaking processes, social change can be enacted by looking at those areas within micro-politics.

In addition, by looking at discourses of early, mid, and late career individuals, the nuisances of the problem are further teased apart. Thus, change initiatives can be tailored by an individual's career stage experiences.

Limitations of the Study and Implications for Future Research

This study utilized a snowball sampling technique. There were a number of risks associated with this technique, given that I was looking for both men and women within this industry and, in particular, was looking for cells of influence. More specifically, in Inenya's case, I was not able to collect any referrals for anyone who worked with her, and so had no cell of influence beyond her own discourses. Similarly, I was only referred one ethnic/raced STEM-professional woman and, unfortunately, she could not participate due to the impending arrival of a baby. I also wanted to include transgender individuals in my sample, but again I received no referrals. Due to my position of privilege within this industry, I had to be very careful to not influence the referrals. In future research initiatives, I would specifically target the recruitment of transgender individuals and ethnic/raced individuals. I would also target individual recruitment to ensure I had complete cells of influence.

I must also specifically address my former work unit. I had to exclude these individuals because of my privileged position in this business unit. I urge others who are interested in studying the Canadian space industry, and its systemic discrimination, to take a close look at this unit's discourses and power-relations.

Another limitation of this study is the influence of Canadian space industry historical discourses. In particular, I did find important archives and academic literature of STEM-

professional women, and non-STEM professional women's experiences in the U.S. space industry. I have, so far, found no academic literature focused on Canadian women's contributions to Canadian space interests. I did find, very recently, some Canadian archives focused on Canada's efforts to launch a satellite into space during the Cold War, and a reference to the 100 individuals who worked on this initiative. Future research must include an examination of these archives to bring to light Canadian STEM-professional and non-STEM-professional women's role in this satellite launch, and in other roles they may have taken on. I say 'must' because, as it stands today, these women and their experiences are hidden in our Canadian past of 'doing space'.

Final Word: My Journey

I dream of the intellectual who...contributes to posing the question of knowing whether the revolution is worth the trouble, and what kind (I mean, what revolution and what trouble), it being understood that the question can be answered only by those who are willing to risk their lives to bring it about (Foucault, 1988b, p. 124).

I must take a moment to share this study's contribution to me personally. As an insider within the Canadian space industry, participants talked freely and openly about both their happy and painful experiences with me. They often tried to include me in their experiences, saying 'you know' to me many times. After two consecutive difficult interviews, one that lasted over three hours, where Vigrine shared her emotional destruction within this industry, and the other interview, which reminded me of my early career when pornographic movie nights would occur on site where I worked, I had to stop the interview process for a few weeks. I returned to the process with a realization that I

would continue to hide my own suite of identities, and my emotions, from participants to ensure that I could complete the data collection phase. I also recognized, at the time, that this approach of hiding was not a mental health practice that I could maintain long-term.

Once I completed all the interviews, I was hyper aware of the discourses around me, in my business unit in particular, and found that it was getting more and more difficult to continue within these day-to-day power-relations. For years, I realized, I had been hiding ‘who I am’ to ensure I would ‘fit’ within the industry. I found that I could no longer take on this burden of hiding and, as a result, I quietly resigned from my position after over 20 years of service. Some former colleagues were surprised that I did not grandstand my way out of the building; in their minds, I was THE spokesperson that could talk to all that was wrong within the organization/industry, and ‘fix’ things for other STEM-professional women. I chose to stay quiet for a number of reasons, some of which were very personal.

I now find myself an outsider, working at a grassroots level of activism, calling on social media to invite other former STEM-professional, and non-STEM-professional, women employees to join together once a month. I am also providing back room support to those individuals working on putting in place various initiatives with respect to Canadian public servant women. The privileges I have – very supportive family and friends, and financial security – made it possible for me to make this decision to leave the space industry. I recognize that not all STEM-professional women have these luxuries, and I will continue to work at various interfaces for their benefit.

I dreamt, just as Foucault did, of revealing the power-relations at work within ‘my’ industry at the start of this journey. I did not seek out a revolution; I believe it found me.

The social reality of exclusion exists, and has for a long time, from both a global sense and a Canadian sense, such that I believe we have become complacent within this panopticon of control (Foucault, 1977). As I delved deeper into the participants' discourses, I was forced to remember my own painful experiences. I found that I could no longer be party to the hidden existence I had embraced for so long. I gave media interviews, denouncing the status quo, and stating plainly that "it's unacceptable" that I was the only Canadian woman Mission Manager. These words would mark my 'coming out' in this revolution. The question of whether the revolution is worth it is a resounding "YES!" for me, especially after meeting with young undergraduate students who have hopes of participating in space exploration initiatives. However, the avenue for undoing the status quo now sees my journey following the road as an outsider. I believe that the 'undoing' of exclusion resides within our discourses, power-relations, and critical sensemaking processes. The 'silent killers' of STEM-professional women's space careers are no longer quiet; I have provided a forum, with this study, to do away with this exclusionary social reality.

When I first started this journey, I was willing to risk my 'work-life' to be able to move knowledge on cisgender organizational exclusion forward. In the end, I did sacrifice my work-life to ensure that discourses, rules and formative contexts, dominant ideas, and critical sensemaking processes, would come to light. The revolution for me will continue but from a different perspective, as an academic who will ask students and colleagues to reflect on their own discourses, and on their critical sensemaking processes, when interacting in the cisgender organization.

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Appendix A: Athabasca University Research Ethics Approval



The future of learning.

CERTIFICATION OF ETHICAL APPROVAL - RENEWAL

The Athabasca University Research Ethics Board (AUREB) has reviewed and approved the research project noted below. The AUREB is constituted and operates in accordance with the current version of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS)* and Athabasca University Policy and Procedures.

Ethics File No.: 22260

Principal Investigator: Stephanie Ruel, Graduate Student, Faculty of Business

Supervisor (if applicable): Janice Thomas, Professor, Faculty of Business

Project Title: 'Multiplicity of "I's" in Intersectionality: Women's Exclusion from STEM Management in the Canadian Space Industry'

Effective Date: June 30, 2017

Expiry Date: June 29, 2018

Restrictions:

- Any modification or amendment to the approved research must be submitted to the AUREB for approval.
- Ethical approval is *valid for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.
- A Project Completion (Final) Report must be submitted when the research is complete (*i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable)*) or the research is terminated.

Approved by:
Sherri Melrose, Chair
Athabasca University Research Ethics Board

Date: June 30, 2017

Appendix B: Research Recruitment, Protocol, and Instrument

Participant Recruitment

The research recruitment was conducted via a snowball sampling technique, where the first candidate chosen was done via the CSA's Women in Science, Technology and Management executive committee. Each potential participant was contacted by the principal investigator directly, where an explanation of the research objectives, and possible outcomes were explained. The recruitment script is outlined in Appendix C. Each participant was provided with the informed consent form, reproduced in Appendix D. This informed consent form was signed by the individual prior to the start of the interview.

Research Protocol

The research protocol for this study consisted of the following:

1. The interviewer will agree with the participant on a timetable for the interview, well in advance of the meeting.
2. The interviewer will arrive early to ensure that everything (i.e. tape recorder, water, chairs, etc.) is set up and ready for the interview.
3. Following a brief introduction of who the interviewer is, and of the goals of the research, the interviewer will examine once again the informed consent form with the participant. The interviewer will ask the direct question if the participant still wishes to participate in the process.

4. A range of 2-3 hours, for conducting the unstructured interview, will be identified to the participants during their recruitment. This range will allow for the exploration of the central themes for this research. It will also allow for a positive individualized experience for the participant (Eriksson & Kovalainen, 2012).
5. The interview will be digitally recorded and transcribed. Field notes will not be taken, as they can interfere with the conversational aspect of the unstructured interview (Eriksson & Kovalainen, 2012). For those participants who prefer to conduct their interviews in French, translation and transcription of the interviews will be conducted by a professional translator/transcriber, and then the transcription will be verified by the principal investigator, who is fluently bilingual in French and English.
6. The types of data to be collected include those stories and narratives that will occur spontaneously during the interview. The type of data to be collected will be focused on the outside impact on self-identity; so, in other words, the tales that others tell about, and the impact of those stories and narratives, on the STEM-professional woman. The interview will focus on the participant's meaning-making of those stories and narratives (Eriksson & Kovalainen, 2012).
7. A thank you note will be sent to each participant after the interview.

Research Instrument

Given the intersectional feminist poststructural perspective chosen for this research, with its "focus on interrelations...[and] on the social construction of reality in an interview" (Kvale, 1996, p. 38), the research instrument is composed of some guiding

questions which touch on some core concepts. These guiding questions will be the topic of conversation between the interviewer and the participant. This will allow for the movement of the conversation in many directions (Eriksson & Kovalainen, 2012).

The search for stories will be initiated by asking an open-type question at the beginning of the interview such as:

“Describe for me your STEM career, from your university studies to the present day”.

By beginning with such a question, the participant will have more control over what is discussed, producing more detailed information (Eriksson & Kovalainen, 2012). This detailed information will allow for knowledge to be generated from the perspective of the participant (Kvale, 1996), as opposed to emanating from the perspective of the interviewer.

This open-type question will be followed by neutral, and leading, questions in order to allow the participant an opportunity to elaborate on certain work-life experiences.

These questions may consist of:

"Have your experiences as a _____(woman or man) _____(manager or employee) in the space industry been positive or negative?"

"Can you share with me some positive stories of your experiences in _____(position)?"

A mix of indirect and direct questions, touching on the exclusion of women from STEM management positions, will also be part of the interview. The purpose of this line of

questioning is to surface the power- relations within the web of social interactions. Some possible questions include:

"How would you describe the atmosphere of the last Executive Committee Meeting? Was it collegial and welcoming, or was it a more stressed environment with only certain individuals speaking up? If it was the former, what makes it collegial and welcoming do you think? If it was the latter, why do you think that was so?"

"Have you applied for management positions in your chosen field of study?"

"Can you share with me what happened during the interview/selection process?"

"What did you do?" "Did you talk to anyone else about your experience?" "What did they think?"

The interview will conclude with a "clearing question" (Eriksson & Kovalainen, 2012, p. 85) such as:

"Can you think of anything else that you would like to add to our conversation?"

This type of question can provide an opportunity for the participant to add ideas that may not have been discussed during the interview. This type of question may also bring forth new insights, and create awareness on the part of the participant with regard to the study's theme (Kvale, 1996).

Appendix C: Participant Recruitment Script

The name of the person responsible for the study, along with their contact information:

Principal Investigator:

Stefanie Ruel, Athabasca University Doctoral Candidate

Email: stefanie.ruel@dba.athabascau.ca

Telephone: 438-381-9899

Reference to the participating university:

Athabasca University is the participating university.

Description of the research:

This intersectional feminist-based research has as a purpose to facilitate a better understanding of the women who are STEM-professionals, and who work within the Canadian space industry. The principal investigator wishes to bring forth the stories, and narratives, of STEM-professional women and men, who work with these women, within this particular organizational context. The principal investigator is investigating the discourses that create and sustain the positioning of STEM-professional women outside of management. In this way, new insights and discoveries on how to effect change within this industry will be brought forward.

Evaluate Eligibility to participate:

Q1: Do you currently work in the STEM field of the Canadian space industry?

Q2: Have you previously worked in the STEM field of the Canadian space industry?

Q3: What type of position did you/do you hold in this industry?

Q4: In terms of your ethnic/race group, I would consider myself to be _____

Q5: In terms of your gender group, I would consider myself to be _____ (some possible options: I am a woman, a man, a transgender individual, agender, cis-individual, etc.)

Q6: In terms of your sexual orientation, I would consider myself to be _____ (some possible options: I am not totally sure, I keep changing my mind, heterosexual, homosexual) (Ashmore et al., 2004)

If not eligible, go to closing remarks.

The types of questions/conversation that will be asked:

The data collection method will be an unstructured interview ("a conversation"), that will be tape recorded, and transcribed to allow for later analysis.

The approximate time to complete the interview:

The expected duration of your participation, if you agree, is within a range of 2-3 hours, for one interview, at a location to be communicated to you. This location and the time of the interview will be away from your place of work, and will be at your convenience, to minimize impact on work-life, and family-life.

The confidentiality of their participation, and how the research team will protect their private information so that they cannot be identified in the process:

Your participation has been recruited by snowball referral method, where word-of-mouth recommendations were used. However, no confirmation will be provided to the person making the recommendation of another to ensure participant confidentiality.

Interviews will be scheduled in such a way that no accidental crossing of one participant with another will occur.

An ongoing dialogue with you about your ethical rights to participate, or to withdraw, will be prevalent throughout the process.

The interviews will be conducted in an off-site location, away from your place of business.

The confidentiality of your participation, and that of your employing organization, will be maintained via the use of non-identifiable names in the final report (e.g. Jane, Joe, etc.).

Data will be kept in a confidential password-protected database located in Montreal, Quebec.

A direct question of whether the individual wishes to participate or not:

Are you interested and able to participate in this study?

Closing Remarks:

Thank you for taking my call/answering my email/agreeing to meet with me face to face.

(Pos.): I look forward to scheduling, and meeting with you for the interview; or

(Neg.): If at any time you change your mind, and wish to participate, you have my contact information.

(Does not fit profile): Thank you for taking the time to answer my questions. We are looking for STEM field participants exclusively. If in the future we consider doing research with other/different occupational groups, would it be all right if I contacted you again?

Appendix D: Participant Recruitment Consent form

Title of the project:

Multiplicity of “I’s” in Intersectionality:
Women’s Exclusion from STEM Management in the Canadian Space Industry

Contact Information for Research Team:

Principal Investigator:

Stefanie Ruel, Athabasca University Doctoral Candidate
5539 Ashdale Avenue
Cote-Saint-Luc, Quebec H4W 3A3
Email: stefanie_ruel@dba.athabascau.ca
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Supervisors:

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Dr. Gabrielle Durepos
Department of Business and Tourism
McCain Centre, Office 406M, Mail box M115
Faculty of Professional Studies
Mount Saint Vincent University
166 Bedford Highway
Halifax, Nova Scotia, B3M 2J6
Email: gabrielle.durepos@msvu.ca
Telephone: 902-457-6230

Dear _____,

You are being invited to participate in this research project, following a recommendation from another research participant, given your background in the science, technology, engineering and mathematics (STEM) field of the Canadian space industry.

This intersectional feminist-based research has as a purpose to facilitate a better understanding of the women who are STEM-trained, and who work within the Canadian space industry. The principal investigator wishes to bring forth the stories, and narratives,

of the STEM-professional women and men, who work with these women, within the particular organizational context of this industry. The principal investigator is investigating the discourses that create and sustain the positioning of STEM-professional women outside of management. In this way, the principal investigator aims to produce knowledge that does not perpetuate the arguments of the past, leading to new insights and discoveries on how to effect change within this industry. The data collection method relies on unstructured interviews ("a conversation"), that will be tape recorded and transcribed to allow for later analysis. The expected duration of your participation is within a range of 2-3 hours, for one interview, at a location to be communicated to you if you agree to participate. This location and the time of the interview will be away from your place of work, and will be at your convenience to minimize impact on work-life and family-life.

Given that some individuals may be sensitive to the topic of the lack of women in management positions in this particular industry, potential adverse effects include psychological and social risks. That is, you may feel uncomfortable/embarrassed/anxious, or you may feel a perceived loss of status or privacy. The following precautions will be put in place to minimize, as much as possible, these risks of harm:

Uncomfortable/embarrassed/anxious:

- a. an ongoing dialogue with you about your ethical rights to participate or to withdraw will be prevalent throughout the process; and,
- b. a follow up with you, once results are collated and prepared for distribution, will be offered as way to develop your own knowledge, and to be able to see what benefits have come from your participation.

Perceived loss of status or privacy:

- a. your participation has been recruited by a snowball referral method, where word-of-mouth recommendations has been used. However, no confirmation will be provided to the person making the recommendation of another to ensure participant confidentiality;
- b. the interviews will be conducted in an off-site location, away from your place of business;
- c. interviews will be scheduled in such a way that no accidental crossing of one participant with another can occur;
- d. confidentiality of your participation and that of your employing organization will be maintained via the use of non-identifiable names in the final report (e.g. Jane, Joe, etc.); and,
- e. data will be kept in a confidential password protected database located in Montreal, Quebec.

Your signature signals your consent to participate. You may refuse to answer some questions. In line with Social Sciences and Humanities Research Council (SSHRC) Archiving Policy requirements, raw data will not be disposed of but will be maintained indefinitely. Access to this raw data, with identifiers removed, will be available only to the principal investigator and the identified research team. At any time before, during or after your participation, you may withdraw this consent without prejudice. If any data has been collected at the time of withdrawal, you may request that the researchers listed above destroy any, and all, data collected through your participation.

All information will be held confidential, except when legislation or a professional code of conduct requires that it be reported.

The results of the study will be disseminated via a final dissertation report to Athabasca University, to participants, to academic publications, to presentations at academic conferences, and to Canadian space industry road-shows.

Thank you very much for your consideration of this request. If you have any questions or concerns about this research exercise, please contact the above-mentioned members of the research team, or the Athabasca University Ethics Officer, Gail Leicht:

University Research Services
Athabasca University
1 University Drive
Athabasca AB T9S 3A3
E-mail: rebsec@athabascau.ca
Phone: (780) 675-6718
Toll Free: 1-800-788-9041 ext. 6718

I have read and understood the information contained in this letter, and I agree to participate in the study, on the understanding that I may refuse to answer certain questions, and I may withdraw during or after the data collection period.

Signature of participant: _____

Date: _____