LUND UNIVERSITY

“I Love Science, Sometimes Science Doesn't Love Me”

Cultural Analysis of Perceptions of Failure Among Preclinical PhD Students of Medical Science

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Abstract

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Failure is an unavoidable part of scientific research, as well as crucial for the generation of new knowledge. Paradoxically, recent studies have noted that highly competitive scientific environments leave little room to make use of failure's potential, and instead represent the latter as undesirable or even threatening. These notions are reproduced to new generations of scientists in training and have been described to negatively impact mental health and retention in medical research. In this thesis, I aimed to understand the ways in which PhD students of preclinical medical science at Lund University define, experience, and manage failure with regards to their research projects and in the context of the academic culture and social relations in which they are situated. I relied primarily on ethnographic interviews with PhD students who I recruited using the snowball effect, and whose responses I contextualized with those from master's students and a faculty administrator. I used concepts of cosmodicy, performance and happy objects to integrate my conclusions with prior theoretical works. I show that in absence of consistent positive framing, failure turns from a common outcome to be managed, to an extraordinary event which should have been avoided and which is understood in non-constructive personal and moralistic terms. Experiences of failure are emotionally charged and commonly shared between PhD students, affecting feelings of belonging, alienation, and passion for science. I find that establishing a supportive working environment which is not conditional on individual experimental outcomes is necessary for PhD students to develop professional independence and confidence. Finally, I discuss specific approaches to guidance and leadership on the level of research groups and the faculty which affect perceptions of failure in medical research. With this thesis I bring together and expand existing understanding of professional failure and higher education on the case of PhD studies of medical science with the hope of contributing to supportive, high-quality learning and work environments in competitive research fields.

Keywords: failure; medical science; PhD students; meaning making; emotions; belonging; wellbeing; ethnography; cultural analysis.

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1. Introduction

There is a common saying that no one is perfect. People make mistakes and fail all the time. “Being fragmented, and not feeling oneself as being in control, being unmastering subject, somebody who is lost, someone who can’t become, and someone who doesn’t know, most importantly, who isn’t always in control of knowledge” (Heineman, 2012) is a universal human experience that occurs again and again in our personal and professional lives. But what *is* failure? This simple question has no easy answer because ways of defining, experiencing and acting upon failure are numerous, changing and context specific (Gruhlich, 2023, p. 68). This is why understanding failure teaches us about the ways in which we perceive the world and live in it. Since it is common, one could imagine that discussing failure should most often occur without of shame and guilt. And yet, failure is commonly associated with exactly those negative emotions (Sandage, 2005, p. 17): the lack (Mica et al., 2023, p. 6), “the interruption, decline or abandonment of an attempt towards ‘something’” (Scott, 2023, p. 111), the insufficiency, the mishap, the deviance (Edwards & Ashkanasy, 2018, p. 167) and mistake (Gross, 2023, p. 405), and open conversations about it outside one’s intimate circles tend to be rare in everyday talk (Edwards & Ashkanasy, 2018, p. 169). Until recently, the same was true in academic writing as well (Mica et al., 2023, p. 4-5).

Like Mica et al. (2023), I noticed that a quick glance at the literature on failure reveals a predominance of research on the topic of science, technology, engineering, and math (STEM) as well as organizational studies. For example, by studying and classifying mechanical dysfunctions and errors, authors sought to connect technological and organisational failures to identify future risks and propose ways to minimize them. Political sciences, economics, international relations, and development studies likewise offer perspectives on failure with the common understanding that it should be prevented. The very same negative assumption about failure seemed to guide a general reluctance towards addressing it in earlier studies in the field of social sciences, with discussions revolving around what constitutes failure and to what extent it is socially constructed. Nowadays, failure studies are being shaped from their fragmented theoretical heritage as an integrated field of social science (Mica et al., 2023, p. 5). Rather than looking at what failure is, contemporary social studies are recognizing how exploring perceptions of failure enables us to understand the structure of our social world and the way we organise it into a comprehensive experience of normativity (Heineman, 2012; Mica et al., 2023, p. 5). In other words, they focus on both the origin and consequences of the given definitions of failure (Mica et al., 2023, p. 5).

Most authors of critical failure studies agree that failure is not just an event, but rather a social action which failed to meet the expectations of an individual or/and their community and should as such be considered as inseparable from dominant social norms and ideologies (Kessler, 2023, p. 124; Mica et al., 2023, p. 4-5). Through its connections to inequalities, forms of exclusion, discipline and unequal power relations, some authors described failure as state of inaccessibility and unfulfillment, when individual is not able to activate their own safety nets to overcome the encountered absence (Mica et al., 2023, p. 6). The growing attention to failure calls for further investigation of the ways in which people manage and make sense out of failure, particularly in social contexts that remain poorly understood, such as, for example, professional life (Gruhlich, 2023, p. 37-68) within the highly competitive field of academia (Edwards & Ashkanasy, 2018, p. 180). I focused my project on PhD students of medical science (also known as biomedicine) as a group which is in the process of entering, internalizing or rejecting the professional culture of biomedical research (Zhang, 2022, p. 10-12).

Using cultural analysis, I want to bridge the gap in understanding of failure within preclinical biomedical research. I will do so by studying the way in which PhD students experience failure because I want to find out what effects these definitions of failure have on the way in which PhD students relate to their work and to their colleagues in order to show how do perceptions of failure shape and are shaped by medical research culture. Existing perceptions of failure have been linked to high rates of stress and mental health problems, toxic working environment, questionable research practices and a reluctance to apply innovative approaches to research problems (Edwards & Ashkanasy, 2018, p. 168; Halven, 2023, p. 354-356; Marques, 2024, p. 110-112). Therefore, I hope that this thesis could be useful to anybody who is looking for informed suggestions on the ways to foster a supportive, high quality academic research environment.

1.1. Aim, research questions and disposition

The objective of this thesis is to provide a better understanding of the meanings attributed to failure, as well as of how existing notions of failure impact those who share them, on the case of preclinical research in medical science. In this thesis, I therefore aim to understand the ways in which PhD students of preclinical medical science at Lund University define, experience, and manage failure with regards to their research projects in the context of the academic culture and social relations in which they are situated. To realise this aim, I will answer the following research questions:

1. How do social interactions, wider research culture and local institutional notions and rules shape these perceptions of professional failure?

2. What are the consequences of such understandings of failure for the ways in which PhD students of medical science relate to themselves, their work, colleagues, and the field?

In what follows, I first review previous studies addressing failure in academic culture and medical science community, and then proceed by introducing theoretical frameworks I used for the purpose of this study. Later I describe the methods and explain the associated ethical considerations as well as my positionality within the research field. The body of the thesis is my cultural analysis and discussion of the results I obtained during my ethnographic fieldwork. A summary of my findings and a discussion of possible applications, limitations and further research avenues constitute the concluding part of my work.

1.2. Previous research

As mentioned above, I tried to situate this thesis among contemporary failure studies and build upon those that particularly address failure in the context of the scientific research. Here, as Edwards and Ashkanasy (2018) note, failure appears in numerous forms that encompass unavoidable errors, mishaps that could be avoided, and misalignment in social interactions. Due to the nature of laboratory work, failure is particularly common and only becomes more so the further one progresses in their education (Edwards & Ashkanasy, 2018, p. 167-168). For example, “applications for funding, poor teaching evaluations, negative feedback from students, unsuccessful promotion applications, rejection letters from journal editors, unsuccessful research outcomes and failure to achieve job security through a tenured appointment” (Edwards & Ashkanasy, 2018, p. 167) are all common parts of an academic career. This chapter is dedicated to reviewing existing studies on how failure is perceived, experienced, and managed in the context of scientific research. I will refer to several critical and social theorists, among others, Edwards and Ashkanasy (2018), Gross (2023), Halberstam (2011), Haiven (2023), and Kessler (2023). As critiques and commentaries on scientific culture and working conditions also come from within the field, I additionally refer to Firestein (2023), Bodewits (2017), Marques (2024), and Zhang (2022), who are biomedical researchers themselves. I will describe the historical role that failure had for the establishment and advancement of modern science, proceed by discussing the shift in perspective on failure within contemporary scientific culture due to the process of financialization,

and point to the consequences for the members of the scientific community and their work. Lastly, I will present alternative conceptualisations that free failure from being perceived only as success’ opposition. I will show that failure is not only an important part of science but that it can also be understood to visualize oppressive social systems.

1.2.1. Perceptions of failure and norms of the scientific culture

According to Oliver Kessler (2023) failure signifies “a certain characteristic to an empirically observable event” (p. 124) that is interpreted as unexpected yet otherwise avoidable, and which raises “questions of accountability and responsibility” (p. 125). Thus, failure is not inherently related to an object per se, but to socially situated and constructed expectations that were not met (Kessler, 2023, p. 126-127). These expectations are contingent on pre-established social roles within the context of specific institution. “Students form expectations about their professors not as John, Mary, or Tina – but as students. Professors form expectations about their students by being in a certain position provided by the *institution of the university.*” (Kessler, 2023, p. 127). Thus, the process of becoming a PhD student in biomedicine involves adjusting to, internalizing, and performing according to institutional rules and expectations of the university and the associated scientific community.

These rules are rooted in the modern scientific culture, which itself proudly originates from three major social innovations: doubt in authority, experimentation as a source of knowledge, and promotion of failure as a means of acquiring knowledge. Rejection of traditional authorities created major unknowns and the scientific method provided a way to fill them with new truths which were thought to be universal and independent of human preconceptions (Firestein, 2023, p. 416-418). This idealised understanding of failure, however, changed in practice primarily through the invasion of economization in public education from the 1990s onwards (Haiven, 2023, p. 353).

1.2.2. Financialization of the Academia

The nature of the university as part of the public sphere shifted towards serving the “industry or nation” (Halberstam, 2011, p. 9) to the university as corporation (Halberstam, 2011, p. 9). Students are increasingly forced to obtain their degree in higher education, as companies prefer to hire already highly specialised graduates. As Haiven (2023) notes: “Amidst financialization, university education has increasingly been stressed as a private/.../’investment’ to be undertaken by individual students, through which they can accumulate human capital the better to compete in increasingly

austere financialized labour markets” (p. 353). In this space, academics compare and compete with one another in newly introduced systems for evaluating academic impact. The “publish or perish” culture (Marques, 2024, p. 111) forces many academics, along with doctoral students, to compromise their private lives and to meet the institutional expectations of deliverables. As Karin Bodewits (2017) reflected on the pressure to publish: *“*As long as I remain unpublished in the field I might as well play Sudoku all day or amble along Berwick beach with a metal detector or otherwise live into the solitary existence which will be my destiny” (p. 113). It is important to note that such approach to research does have its positive sides, as it creates incentives and opportunities for professional recognition, collaboration, and scientific output (Edwards & Ashkanasy, 2018, p. 178). Even so, most scholars in the field have criticized the sharp binarism and lack of a “second place” in academia which can lead to bad interpersonal relations, diminished confidence, loneliness, and poor work-life balance (Bodewits, 2017, p. 124-198).

1.2.3. Attitude towards failure in contemporary scientific culture

Financialization of academia additionally affects the way in which failure is perceived, experienced and managed. In an “adversarial society”, striving toward predictability and demanding accountability at all costs reinforce the practices of blame as opposed to merely learning from the unexpected outcome (Gross, 2023, p. 412-413). Consequently, failure and uncertainty are difficult to discuss (Gross, 2023, p. 412). Firestein (2023) agrees that negative results are harder to publish and criticises the low proportion of funding dedicated to high risk, high reward projects (Firestein, 2023, p. 419-420). Edwards and Ashkanasy (2018) note that “organisational cultures (and in turn managers) frequently chastise employees following failed experiments, leading to reluctance to adopt new approaches and ideas” (p. 176-177). The authors furthermore explain that academics sometimes experience strong fear of failure due to continuous pressure to perform and deliver “interesting results” (Edwards & Ashkanasy, 2018, p. 168). The idea that potentially disastrous consequences may follow if desired results are not obtained diminishes the potential of failure for learning and minimizes curiosity and “imaginative play” (Haiven, 2023, p. 356). At its worst, fear of failure leads to research misconduct such as cutting corners, plagiarism and even data fabrication (Marques, 2024, p. 111; Edwards & Ashkanasy, 2018, p. 168). Fear of failure can also lead to feelings of anxiety, depression, eating disorders, stress, and burnout (Gustafsson et al., 2023, p. 54), negatively affecting both professional performance and mental health (Marques, 2024, p. 112),

particularly when it is present for extended periods of time as a “chronic feeling of failure” (Haiven, 2023, p. 354-356).

1.2.4. Calls for rethinking academic culture

In January 2024, *Hypertension* published a forceful critique of the present-day working climate and personal relations within the field of medical science. The author warned that supportive social environment is crucial for research progress (Marques, 2024, p. 111). At the same time, she notes that acceptance of toxic work culture is decreasing among new generations of students which provides “an opportunity to turn research culture around” (Marques, 2024, p. 112). This transformation must include a constructive understanding of failure, as organisational studies have consistently demonstrated the benefits of promoting open discussions of failure in science through supportive leadership (Edwards & Ashkanasy, 2018, p. 175). Thus, “a truly innovative culture is people-centric: it promotes a culture that supports curiosity, collaboration, and willingness to take risks” (Marques, 2024, p. 111) through inclusivity, democracy, and clear, empathetic, and attentive communication, marked by mutual affirmation and recognition of one’s efforts. In turn, welcoming social climate of the lab would pay off not only in terms of researchers’ wellbeing, but in traditional measures of performance as well (Marques, 2024, p. 110-111).

1.2.5. Alternative ways of conceptualising failure in science

In his advocacy for embracing the potential that resides within failure, Firestein (2023) argues that “real failure” (p. 417) – here meaning an outcome caused not by mistakes but instead by incorrect starting hypotheses – leads to generation of new, better questions and eventually to a more complete understanding of the world. According to him, “failing better” is indistinguishable from success (Firestein, 2023, p. 417-418). While Edwards & Ashkanasy (2018) similarly encourage “intelligent failures” (p. 170) in the context of scientific research, Gross (2023) talks about “successful failure” (p. 405) to describe a process of enduring and continuing and describes mistakes and ignorance as crucial for success and knowledge generation, although not desirable per se. Re-interpreting negatively charged ideas of failure into unavoidable ignorance in the context of scientific research, for example, enabled him to re-direct attention from finger pointing and shaming to acknowledging new opportunities for further research (Gross, 2023, p. 405-410). On the other hand, Susie Scott (2023) avoided classical comparison of failure to success by redefining failure as “meaningful non-

occurrence” (p. 111), fragmenting the act of failure by distinguishing active and purposeful failing and passive and unintended one (p. 116-121).

I find O'Shea's (2023) discussion on materiality of failing particularly inspiring and applicable to the field of medical research, as she argues that to support individuals engaging in “risk play” (p. 480) which could help them to advance their objective, “individual skill building, structural environmental safety, and community support” (p. 487) should actively co-exist. On the case of urban cycling in car-dominated American, she argues that such seemingly non-conformative acts are still grounded in submission, as they tend to adapt to the given problematic circumstances by putting themselves at risk and exclude anyone who is not able to afford to take those risks and engage in such acts. What aims to be alternative is in fact submissive and only perpetuates existing power relations and social exclusion. Therefore, we should not stop at redefining our social worlds but push on to construct new kind of common sense that surrounds it – to reimagine the surrounding system and prioritize community, solidarity, and safety (O’Shea, 2023, p. 488-489).

Halberstam (2011) takes a radical feminist standpoint and argues that we should not be primarily concerned with changing our attitude towards failure by reimagining the world, but strive for changing the latter precisely *through and with* acts that we perceive as failures. Sometimes, he argues, “failing, losing, forgetting, unmaking, undoing, unbecoming, not knowing may in fact offer more creative, more cooperative, more surprising ways of being in this world” (Halberstam, 2011, p. 2-3). Indeed, “one of the things that failure asks us to think about as human is why we’re so invested in this heroic narrative of the human/…/while in fact, maybe one thing that people share as humans is the capacity to fail?” (Heineman, 2012).

Existing studies rarely address the preclinical research culture, and if they do, PhD students as a social group are commonly overlooked in education research, both internationally and in Sweden. As pointed by Swedish Higher Education Authority (UKÄ): “Our focus is often on education on the bachelor’s and master’s level. But it is important to also remember that it is education on a doctoral level which supplies society with research competence and expert competence within most important areas” (2023). I have not come across a study that would portray the intimate reasoning and experiences of failure among preclinical PhD students to inform the broader context of academic culture. By bridging this research gap, I contribute to a better understanding of PhD studies in times when the need for it is increasingly being recognised at national level (Cox &

Christensson, 2024, p. 26; Swedish Higher Education Authority, 2023) as well as internationally (Nature, 2024, p. 244), and provide useful information for those who wish to support their or others’ learning and wellbeing in biomedicine. Additionally, I point to the consequences that perceptions of failure have for PhD students to support the argument for a positive and constructive re-framing of professional failure. In what follows, I will present the theoretical frameworks that will enable me to fulfil this goal.

2. Theoretical frameworks

In the introduction of her book *Why love hurts*, Eva Illouz (2012) argues that "for sociologists, there is no opposition between individual and the social, because contents of thoughts, desires, and inner conflict have an institutional and collective basis" (p. 13). In other words, we can learn a lot about society and the ways in which social norms and ideals change through time by paying attention to its smallest parts, particularly those that influence our vulnerable perception of the self (Illouz, 2012, p. 15). Thus, "it is now urgent to claim not that the failures of our private lives are the result of weak psyches, but rather that the vagaries and miseries of our emotional life are shaped by institutional arrangements" (Illouz, 2012, p. 4). In this thesis, I follow her call to explore institutional environments by focusing on the ways in which individual PhD students perceive and experience failure with the aim of understanding the broader socio-cultural context.

My ethnographic data highlighted the importance of understanding emotions, making sense of misfortune, systems of justice and blame, sense of belonging, self-worth, and social recognition, and guided me in choosing suitable theoretical frameworks upon which I could build my analysis. Using Schaefer's (2021) notion of cosmodicies (p. 83) enables me to address the ways in which PhD students' experience of failure as well as coping strategies are culturally contingent, learned and changing. I furthermore build on Illouz's (2012) claim that nowadays, "social worth is performatively established in social relationships" (p. 114) to explain the consequences of that the dominant perceptions of failure have on the PhD students' wellbeing and sense of belonging to the scientific community. I also consider how the latter is influenced by notions of an "ideal scientist" which students are "failing" in relation to. Lastly, I use the Ahmed's (2010) concept of happy objects (p. 21-22) to explore the association of failure and emotion, and the way this interaction affects PhD students.

2.1. Cosmodicy: Making meaning out of misfortune

In my analysis, I build on Robert Schaefer's (2021) concept of cosmodicy (p. 83) which helps to explain the ways in which people make sense out of daily experiences fall short of expectations. His notion of cosmodicy is a secular reappropriation of Weber's (1963) analysis of three primary theodicies that serve as religious justifications of the existence of god in parallel to earthly suffering and misfortune (Weber, 1963, p. 205-206), as well as social injustice and inequalities (Weber, 1946, p. 271). In his theoretical article, Schaefer (2021) argues that these meaning-making

frameworks for assimilating disorder of the world (p. 82) into a comprehensible, “meaningful ‘cosmos’” (Weber, 1946, p. 281) did not disappear with the process of secularisation but were instead translated and reappropriated to fit into the modern secular context. Modern scientific advancement and technological innovations hold the promise of a better life that is not always fulfilled, and at the same time “render ignorance of distant catastrophes more unlikely” (Schaefer, 2021, p. 85). This expands the gap between individuals’ perception and ideal of reality, and intensifies feelings of injustice (Schaefer, 2021, p. 81-82). When misfortune is perceived as important, threatening, extraordinary and at the same time potentially preventable, it becomes unacceptable and can no longer be explained within the framework of the mundane or by scientific reasoning. Instead, it begs to be justified within the realm of morality and can be understood using the framework of cosmodicies (Schaefer, 2021, p. 84).

Schaefer (2021) identifies four distinctive types of cosmodicies in the context of secular Western culture. The first type, causalism, is a secular translation of the belief in karma. “Causalist cosmodicy is the justification of present suffering (resp. fortune) by attributing it to past guilt (resp. virtue)” (Schaefer, 2021, p. 87). Accordingly, the world order is just and good, and those who suffer have, by definition, provoked it with their past actions. The second type of cosmodicy is dualism. Its descriptions of the world as either good or bad are binary, extreme and deny its complexity. “Dualisms typically use martial vocabulary” (Schaefer, 2021, p. 88) of heroes, victims, good and evil. The last two types fall under the finalistic cosmodicy, with its expectation for future compensation reflecting the finalistic theodicy and its belief in predestination. According to the finalistic cosmodicy, suffering is perceived as something positive or at least “as informative instruction for future behaviour” (Schaefer, 2021, p. 89), and is the condition for personal growth and wisdom. Schaefer (2021) distinguishes two manifestations of finalism. Ascetic meritocracy renders everybody responsible for their own fate, under the assumption that everybody has equal opportunities to gradually achieve good fortune in life with discipline, self-improvement, and dedication to hard work. Ascetic meritocracy’s counterpart in finalism is romantic inspirationism, which relies on post-romantic values, such as self-realisation, personal growth, passion, spontaneity, authenticity, and creativity. Its glorification of the myth of a misunderstood but passionate genius whose talent and inspiration bring about revolutionary innovations is becoming increasingly prevalent in secular Western societies (Schaefer, 2021, p. 89-90).

For the purpose of my study, I extend Schaefer’s notions of cosmodicy to professional failure and use them as a theoretical tool for explaining the ways in which PhD students ascribe meanings to negative workplace outcomes. I follow his suggestion that further investigations should consider “which social groups adhere to which cosmodicy. Furthermore, it would be interesting to explore how the cosmodicy’s vocabulary varies in different situations” (Schaefer, 2021, p. 91). Specifically, I consider “personal failures on the job market” (Schaefer, 2021, p. 91) and failure within the education system, for which Schaefer (2021) assumes the dominance of ascetic meritocracy (p. 91). Finally, I problematize the presence of moral frameworks in professional failure and discuss the difference between mundane and significant failure as an important part of promoting a constructive research environment.

2.2. Unstable worth of the modern self

As indicated above, I agree with Eva Illouz’s (2012) critique of sociology, which tends to address only collective forms of human suffering due to major crises but neglects the ways in which individuals experience mundane forms of suffering (p. 15). Touching on romantic suffering in the context of intimate relationships, Illouz shows that unlike today, premodern selves’ dignity relied on following a common moral code. Social recognition of one’s worth was based on impersonal objective criteria, such as the individual’s class and social position, and was thus collectively recognized and affirmed. Character was expressed and judged according to an individual’s ability to follow common, clearly defined and thus limited set of virtues, rules, and taboos, that offered guidance as well as a sense of ontological safety (Illouz, 2012, p. 26). In the wake of modernity, traditional ways of relating to oneself and to others have changed, undermining individuals’ resilience to social rejection (Illouz, 2012, p. 23-40).

According to Illouz (2012) “the pressure for self-differentiation and developing a sense of uniqueness has considerably increased with modernity” (p. 112). She explains, “modern worth is chiefly performative: that is, it is to be achieved in the course of and through one’s interactions with others” (Illouz, 2012, p. 119). Individual’s acquired social worth no longer depends on impersonal criteria and is therefore it is no longer stable nor certain. It needs to be continuously established and affirmed in social interactions through individuals’ performance of their own selves as unique and private entities. As the criteria are subjective, a performer can no longer predict how their audience would respond or perceive them. Such dependency on others makes one’s self

particularly vulnerable to different forms of experienced or anticipated social rejection (Illouz, 2012, p. 114-125) and that self-doubt, insecurity and comparing one’s self to others can bring great emotional suffering. Taken together “what we take to be individual aspiration and experience have in fact much social and collective content to them” (Illouz, 2012, p. 14). In this thesis, I follow her example of studying intimate ways in which individuals cope with painful experiences of everyday life and apply her understanding of modern performative self to the construction and validation of a scientific identity.

2.3. Happy objects

The previous two theoretical frameworks demonstrated that even the most intimately experienced sensations are inseparable from broader cultural norms. To compliment this understanding, I will use Sara Ahmed’s (2010) concept of “happy objects” to explain how emotional responses to failure are socially constructed and reproduced.

Discussing happiness and its role in reproducing existing social order, Ahmed (2010) confronts the idea that objects, be it living beings, things, “values, practice, styles, as well as aspirations” (Ahmed, 2010, p. 29) can bring us happiness because they are “good” in themselves. While being itself neutral, an object appears to us as good because we interpret it as such. We strive to be in close proximity to objects which we expect bring us happiness and create our “near sphere” by orienting towards them and rejecting the ones that we do not desire. Instead of being embodiments of happiness, happy objects carry the promise of its realisation somewhere in the future (Ahmed, 2010, p. 32). They are the arrows which lead us in the “right” direction on the path towards happiness and what we perceive as a good life. “The very possibility that we can affect our affections by actions, or through will or reason, becomes the basis of an ethical imperative” (Ahmed, 2010, p. 36). Members of the same affective community should share the happy objects and let them circulate in their accumulation of their affective value. Ahmed continues: “The virtuous agent will not only feel pleasure and pain where appropriate, in relation to the right objects, but will also experience the right amount of such feeling” (Ahmed, 2010, p. 36). In this respect, happiness is closely connected to striving for affirmation, feelings of belonging, and practices of inclusion within the community. In feeling and articulating the same feelings as the others, we are able be sympathetic and aligned towards them. To prevent alienation, the individual might conform to the community by performing emotion work and re-align themselves either by feeling

differently, or just giving that impression. On the other hand, however, the affective value that sticks to object might be changed, with consequences on the way in which people organise and live their life (Ahmed, 2010, p. 21-49).

3. Methods

Meanings and environments are socially constructed, which is why their study expands our understanding of the society they were constructed in (Sunderland & Denny, 2007, p. 52). As "ethnography as a methodology has been honed in the service of understanding sociocultural phenomena and practices" (Sunderland & Denny, 2007, p. 14), I relied on it for the purpose of this thesis. It is not just the capacity to understand the cultural world around me that ethnography enables, but also the possibility of change, when applied to the "solving concrete problems in people's everyday lives, as well as in the context of working life" (O'Dell & Willim, 2011, p. 28). I have demonstrated that perceptions of failure within the scientific community are both poorly understood as well as problematic. Here I will reflect on the ethnographic methods that I used to address this problem in my analysis.

3.1. Method selection and entering the field

I was faced with a research field that was largely physically inaccessible. The nature of laboratory work includes questions of workplace safety and confidentiality. The latter seemed to be the main reason that my request for attending the faculty's workshops for PhD students, for the purpose of ethnographic observations, was rejected. As Davis (2009) notes, an in-depth individual semi-structured ethnographic interview "tends to be the method of choice for ethnographic research on elite groups, where access is likely to be strictly controlled and hence participant observation is problematic" (p. 119). A pilot study with a PhD student of biomedicine additionally proved the interviews to be "the best method *under the given conditions"* (Jordan & Lambert, 2009, p. 24) for the purpose of my thesis, as well as enabled me to adjust the questions that guided me during the interviews (Davies, 2009, 105-106).

In light of conditions presented above, I relied on my personal network for recruitment, triggering "the snowball method, in which one initial contact leads to an ever-increasing number of new ones" (Hirvi, 2012, p. 27). This approach called for additional caution to secure my informants' participation's anonymity. Thus, I supported recruitment with a shared online calendar service Calendly. Not only did the latter enable my informants to choose the time and place of individual interviews confidentially, but it also served as a mechanism that minimized the pressure to participate that my informants might feel if I approached them in person. The interviews ranged from 30 to 75 minutes and were conducted in English. While I hosted a few of them online via

Zoom, most occurred in person at a place preferred by my informants – usually at the Faculty of Humanities and Theology, or the Biomedical Centre. I suggested these settings to secure a quiet and comfortable place that would minimize the impact of other people’s presence on our conversations (Davies, 2008, p. 115). I furthermore provided a detailed consent form where I stated my research focus, purpose and format, interview topics, as well as a detailed description of data processing and storage. I included my own and my supervisor’s contact information along with instructions on how to withdraw from the study, as well as how to file a complaint or object to the use of data. Giving out the form was only one occasion on the continuous process of obtaining consent to participate (Davies, 2008, p. 48), and while the form might have appeared intimidating and made the atmosphere of the interview more tensed than I desired (Davies, 2008, p. 49), I believed it was necessary to “provide information that will enable people to assess the likely effects of the research on them and make an informed decision about whether or not they are willing to participate” (Davies, 2008, p. 48). None of my informants withdrew from participating, and all of them agreed to voice recordings and to being cited in this thesis.

3.2. Research participants

The thesis is based on the data from 18 individual in-depth semi-structured ethnographic interviews (Davies, 2009, p. 105-106) performed in early spring of 2024 in Lund, Sweden. I focused my analysis on ethnographic interviews with 10 PhD students of biomedicine at Lund University. My informants were both Swedish as well as international preclinical researchers of different research groups, years of study, career plans, as well as age and gender. I also interviewed 7 second-year master’s students who were at the time working on their thesis-related research projects. I did that to find out which conclusions are specific to PhD students and to explore if and how cultural perceptions of failure leak outside of the PhD studies and influence master’s students, who are being trained to be able to follow their steps not only in terms of technical skills, but also in appropriate cultural values, behaviour and beliefs. Master’s students also differed in gender, age, country of origin, career aspirations, and research groups. Lastly, to understand the faculty’s perspective on the PhD program, I interviewed a faculty administrator who is a member of a faculty board responsible for setting PhD requirements. As Jordan and Lambert (2009) note, “there are multiple truths to be discovered” (p. 27) about specific phenomena in a single social setting, depending on the specific social position of those involved (p. 27). The scale of this thesis required a focus on students which results in a one-sided portrait of academic research culture and working

environment. It would benefit from not only expanding on the faculty’s point of view, but also from including supervisors in my interviews. Understanding their personal perspectives and experiences within the demanding and competitive research environment in of academia, founding and publishing system and leading the research group, might generate suggestions of how supervisors could themselves be supported in their work.

3.3. Positionality

It is important to reflect on how my position in the field might have influenced my data analysis and conclusions. As Labaree (2002) notes, boundaries between ethnographer as an insider and outsider in the field are oftentimes blurred, transitionary, and a matter of perspective (p. 101). I appreciate that ethnographers increasingly criticize the outsiders’ lack of cultural proficiency, language fluency and general ability to relate and empathize with their participants both among medical practitioners (Hayre & Hackett, 2021, p. 3-6) as well as among preclinical researchers in biomedicine (Zhang, 2022). Since I have no formal training in biomedicine and have no experiences with PhD studies, I could not relate to my participants to the same extent as an insider could, which posed the risk that my ability to grasp the meanings and interpret the scientific culture and its norms was limited (Labaree, 2002, p. 102-104). As an outsider, however, I was also not as involved in the dense social networks of the scientific community, which is why some of my participants might have felt at ease to discuss them. It also made it easier to reflect upon actions and beliefs taken for granted by members of scientific community, but which in fact speak about powerful ideologies, power-relations and meaning-making (Ehn et al., 2016, p. 1-7). Some of my informants specifically stated their appreciation for the interview as a space to consider things they usually do not think about.

On the other hand, my interest in failure within the field was sparked due to my prior personal connections with the field, namely, my partner who is a PhD student of biomedicine himself. Although he did not participate in this study, our conversations allowed me to recognise the importance of addressing the ways in which failure is being discussed and managed within the scientific community. Due to our relationship, I became familiar with how an ordinary day at the lab looks like. I have some understanding of the procedures and tasks within the lab, and I can understand some of the jargon. Furthermore, I am also an international student with long years spent in the academic environment. Being an insider to the wider academic culture required at

times strategies to distance myself from my own experience (Ehn et al., 2016, p. 39), namely through comparing the academic culture with other working environments. Demonstrating my limited cultural fluency and the ways in which I could relate to their experiences enabled me to show empathy and bridge the cultural gap between me and my participants (Labaree, 2002, p. 103-105), as well as to better understand and critically examine the information my informants provided (Jordan & Lambert, 2009, p. 36).

3.4. Data collection

Ethnographic interviews proved themselves as a suitable methodological choice for two main reasons. Firstly, they enabled me "to go beyond what is visible and thus observable" (Kusenbach, 2003, p. 462). The use of the interviews as a method allowed me to explore intimate ways in which they perceive, experience and manage failure, as well as to understand students' perceptions of the PhD program, social relations within their working environment, and future career plans. My approach reduced the negative impact of peer pressure among participants while at the same time answering the need for confidentiality (Fallon & Brown, 2002, p. 196-198). Secondly, the interviews allowed me to address unanticipated themes that were important to my participants, but still guide the discussion when needed (Davies, 2008, p. 105-106; 116). I relied on our brief familiarity and mutual trust, moderate background knowledge as well as on information from previous interviews (Davies, 2008, p. 119) to get past what my participants might have considered the "right" or expected way of thinking or acting. Diving into some of the specifics of the field and focusing on participants' feelings and emotions proved to be a fruitful approach to this barrier. However, time pressure did not allow for follow-up sessions which may help to reinforce some of my conclusions.

I wrote my field notes directly after the interviews were finished and relied on them to draw my conclusions. I also audio-recorded all interviews with my phone and later transcribed them with the online tool Descript. I am aware that transcription is a form of subjective interpretation of speech. It often tells more of the research "purpose, audience, and the position of the transcriber toward the text" (Bucholtz, 2000, p. 1440) than about informants themselves. Transcription is a selective translation of gestures, mimic, atmosphere, and the context in which the conversation occurred (Bucholtz, 2000, p. 1461-1463). Lastly, as an act of "representation, it is also an act of power" (Bucholtz, 2000, p. 1463). Even so, the process of transcribing the interviews was a crucial

step in preparing the data for my analysis. Thus, being mindful of my own positionality in the field, I did everything I could to communicate what my informants told me without compromising their privacy.

Relying mostly on interviews has its limitations. As Kusenbach (2003) explains: “Ethnographic interviews can miss out on those themes that do not lend themselves to narrative accounting, such as the pre-reflective knowledge and practices of the body, or the most trivial details of day-to-day environmental experience” (p. 462). The interviews also took place outside of the lab, which separated “informants from their routine experiences and practices” (Kusenbach, 2003, p. 462). Many researchers emphasize the importance of being in the field and observing it due to the common mismatch of what people say they do and what they actually do (Jordan & Lambert, 2009, p. 33; Kusenbach, 2003, p. 459-462). Participant observations (Kusenbach, 2003, p. 461-462), shadowing (Jordan & Lambert, 2009, p. 35), or walk-along interviews (Kusenbach, 2003, p. 463-478) would be fruitful supplementary methods for further investigations of social relationships and the way members of the scientific community cope with instances of failure *in the time of their occurrence*, instead of reflecting on them retrospectively. What’s more, referring to my observation would enable me to refine my interview questions, dive deeper during the interview sessions, critically examine the narratives I was told, or ask about them *in situ* (Kusenbach, 2003, p. 463). Lastly, my continued presence in the field might strengthen mutual trust and allow both me and my participants to be open in our discussion of failure within the academic culture.

In this light, the information that my informants provided me with led me to explore further and supplement my data with other methods that do not depend on ethnographic observation. For the purpose of this thesis, I used the internet to search the Future Faculty’s as well as Faculty of Medicine’s calendar of organised events, which enabled me to better understand the faculty’s attitude towards students’ wellbeing and performance. I also used it for “carrying out documentary research” (Davies, 2008, p. 151) on the Faculty of Medicine’s documents regarding the requirements for PhD defence, since my informants mentioned them very often. Lastly, I turned to Westling’s *BMC:s rötter*, for which, as I am not fluent in Swedish, I had to rely on automated digital translation. The book served as a good source of information for field contextualisation in terms of its history and management, but enabled me to understand the challenges, hopes and expectations towards PhD students of the two former Faculty’s deans.

3.5. Data analysis

The set of ethnographic data I collected was extensive. I needed to systematically arrange it to be able to see "repetitive patterns of action and consistencies in human affairs as documented in the data" (Saldaña, 2013, p. 5). I chose to code the transcriptions of PhD student interviews in NVivo 14 as a form of qualitative data analysis, and I repeated the process separately for transcriptions of the interviews with master's students. Saldaña (2013) explains: "A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldaña, 2013, p. 3). With the research questions in mind, I attributed descriptive codes (Saldaña, 2013, p. 4) to relevant sections by summarising them with key word or a phrase for which I believed represents them best. The choice of grouping was thus subjective. Saldaña (2013) warns: "Coding is not a precise science; it is primarily an interpretive act. Also be aware that a code can sometimes *summarize*, *distill*, or *condense* data, not simply *reduce* them" (Saldaña, 2013, p. 4), which may have consequences on the eventual conclusions. I grouped my codes into categories that in turn represented major themes: attitude towards faculty requirements, lab group members, supervisors, failure, program, academic culture, and career plans. "Coding is a cyclical act" (Saldaña, 2013, p. 8), and having my data arranged in this way enabled me to compare the ideas, beliefs and notions of my participants, and decide that "second cycle coding" (Saldaña, 2013, p. 3) is needed. I did that with the help of PowerPoint, in which I additionally visualised and structured the codes. I did the third and final cycle of coding by mapping the themes and associated quotes with hand-written notes, until the coded themes moved into the background and gave way to crystallised patterns of underlying ideas with which I engaged in my analysis, such as sense of self-worth, belonging, passion, and sacrifice.

3.6. Pseudonymisation

Discussing perceptions and experiences of failure provided me with the sensitive data that I handled with great caution. Data disclosure might harm my participants' career prospects, their social relations, or cause them to lose face. Since I relied on a snowball effect for recruitment, I knew that the students might know each other well. Thus, the pseudonymisation of quotes presented in my analysis included more than just omitting names, personal information and gendered pronouns that could leave my informants or their colleague identifiable. While maintaining the message of the quotes as well as the level of education of informant, I corrected the grammar and word order of

the quotes, and omitted repetitions as well as filler words to neutralise the unique speech style of my informants (Bucholtz, 2000, p. 1453-1458; Davies, 2008, p. 51-53). I wanted to bring the thoughts of my informants closer to the reader while still preserving their humaneness and privacy, and so I disassociated the quotes from PhD students, reshuffled them, and randomly attributed them to 10 fictional characters constructed from related narratives from at least two students. Each character should thus be seen only as a box that contains quotes from different sources to make my informants unidentifiable. I repeated the same process for those master’s students whose quotes I used more than once. All participant names used in this thesis are pseudonyms taken from the most popular names in the United States of America over the last century (Social Security Administration, n.d.).

4. Field description

The Faculty of Medicine in Lund was established at the end of the 17th century as part of Lund University and has been growing in reaction to novel scientific discoveries, international collaborations, and public demand for trained experts in biomedicine ever since. As one former vice-dean wrote: "At the end of the 1980s, it became obvious that the buildings of the medical-theoretical institutions in Lund no longer correspond to the requirements of the time" (Belfrage, 2001, p. 142), as major technological and methodological advancements required not only state-of-the-art a working environment for the labs, but also close collaboration among different branches of biomedical research. To keep up with national and international educational and research development and support the faculty's competitiveness, the idea for the new type of research institution – the Biomedical Centre (BMC) – was proposed, revised, and implemented in the 1990s with funding from the Knut and Alice Wallenberg Foundation and the government. According to a vice-dean, "The BMC today functions as a "research hotel" with the research groups as paying "hotel guests". /…/ The research groups thereby become their own economic profit units in a completely new way, with the opportunities but also the financial responsibility that this entails" (Belfrage, 2001, p. 155). Research groups can be located anywhere within BMC, with the idea that such organizational freedom stimulates collaboration among them within the department and even buildings themselves.

The faculty of medicine has been struggling with decreased state grants for medical education and research ever since the 1990s, along with increased costs for experiments and resources, while at the same time "wages are constantly rising more than the appropriations" (Westling, 2001, p. 162). Turning to external grants considerably increased the faculty's total financial resources, which "naturally means that the faculty's activities are largely controlled from the outside. The external financing is good because it is a certain guarantee for quality and productivity. But the increased dependence on external funding sources also has disadvantages" (Westling, 2001, p. 163). Since individual grants are usually smaller, unreliable, and last for a short period of time, long-term research is at a disadvantage. Efficient, and clear self-presentation for grant applications prevents the sole focus on research, and is confusing especially for the younger, less experienced researchers. Unsurprisingly, many talented younger people are drawn to industry positions due to higher salaries and better working conditions. In this respect, encouraging students' "interest on

opportunities and excitement in exploring the unknown" (Westling, 2001, p. 166) seems to be of crucial importance for long-term success of the BMC.

PhD students that participated in this thesis were all preclinical researchers at BMC, coming from different lab groups and years of studying at their PhD program of biomedicine. Being ambitious, most of them decided to do a PhD because they wanted to have their own project, be responsible for its management and learn how to work independently. Some of them were particularly drawn to it as they perceived it as a challenge, and were looking forward to growing personally and professionally, and "do something that no one has done before". They applied because they wanted to become experts in science and improve their chances of getting a job that they would enjoy. To my informants, Lund University seemed like an attractive option for doing a PhD mainly due to its good reputation, and the opportunities for disciplinary and interdisciplinary collaboration. Good research funding that can cover experiments and a PhD salary was important, especially to those international students who were used to worse working conditions in other countries. Having a project as a master's student or as a research assistant at the same research group before committing oneself to a 4-year PhD project is a very common practice, and based on my interviews seems to benefit both the supervisor and PhD students. While it allows the group leader to evaluate how the PhD student fits in the lab group and how they work, it also enables the PhD student to become familiar with the working environment, collect data ahead of time, and, if not being satisfied with their experience, go elsewhere. Half of my informants decided to do a PhD in their lab because the position was already available to them. And yet, above all else, finding the topic of the project interesting was the most important motivational factor that drew students towards the projects on which they are working now.

The PhD program is centred around a one or more research projects, during which PhD students should learn how to work as independent researchers. During this time, they rely on their supervisor, who is usually head of a research group or "principal investigator" (from here on referred to with the common abbreviation PI), for advice and financial support. Even so, not all of them felt supported due to tense personal relations, a PI's physical absence, or a PI's lack of expertise. Almost all the PhD students were worried if they would be able to fulfil the faculty's obligations and graduate on time. Indeed, their obligations expand beyond focusing on performing experiments and managing related paperwork, administration, supplies, communication,

scheduling, reading, and article writing. They are expected to take on interdepartmental, departmental and research group tasks, as well as any tasks that PIs additionally assign to them. They are required to attend supervision sessions and different meetings to present and discuss their work. They must attend faculty courses, conferences, summer schools, a number of seminars, and are expected to be present at as less formal gatherings such as lab retreats or dinners, which not only support acquiring new knowledge, but also the expansion of one’s professional network. Lastly, they are also responsible for transmitting skills and key cultural values of the scientific community onwards by mentoring its new or “novisch” members - the master’s students. Due to time constraints and faculty requirements, PhD projects seem to students more risky and less rewarding than compared to a master’s thesis project. The PhD program only rarely allows the students to explore the unexpected and unknown aspects that they come across while working on their projects, although students’ passion for science derives precisely from freedom to explore new things. Instead, their project is usually goal-oriented and directed towards publishing as, in the current scientific culture, negative results are harder to publish. Being curious as they are, many PhD students feel disappointed, as they feel that they are left with little or no room for failure at all, let alone exploring its possibilities or learning from it, even if it is an integral part and condition for scientific advancement. In the next chapter I will offer my analysis of the collected empirical data supported by previously mentioned frameworks of cosmodicy, the self and happy objects to explain the ways in which PhD students assign meaning to professional failure.

5. Analysis

As flattered as I was when several of my informants expressed their enthusiasm about failure being the topic of my thesis which they claimed to be important, it made me wonder – why is that so? Given how common it is, my thesis topic should be if anything, boring or inconsequential. Far from it, my participants’ answers agreed with previous research claiming that failure plays an important role in scientists’ work and wellbeing (Edwards & Ashkanasy, 2018, p. 167). As Karen explained:

> “Failure gives you the opportunity to actually be a true scientist, because that's what actually a scientist should do, right? Try to solve a problem. And, I think, yeah, it's like you fail, this experiment didn't work as you planned, but now you have to solve this problem, so now you have to think and create solutions and read about it, go to the literature, think about innovative ways, and that's actually what makes you *feel* like a scientist.” (Karen, PhD student)

In this and similar idealised descriptions it seemed that there is a possibility and expectation that medical research would embrace and even be driven by failure. However, my participants always noted later that, often, the scientific environment does not realistically allow one to maintain this positive attitude. The above quote was followed by a lengthy discussion on how far from this idealised picture experiencing failure in higher education medical research actually is.

I address this contradiction in the following analysis, divided into five main subchapters. I begin by addressing the students’ attitude towards science. Then, I describe the ways in which students perceive and define failure in the context of medical science, as well as the ways in which they apply different systems of categorisation to organise the chaotic experience into comprehensible reality. I proceed and present sharing the experiences of failure and compensating for encountered problems excessive work as two main strategies of coping with failure among PhD students. I discuss the ways in which failure can foster or undermine a sense of solidarity, belonging and social recognition, and the ways that affects students’ wellbeing and attitude towards their work and professional field. In the last two subchapters, I address personal experiences of failure in their broader social context and argue for them to be considered as indicators of structural challenges on the level of individual lab management, the faculty, and academic culture.

5.1. Attitudes towards science

> “You start connecting yourself to your work in a way that in most other kinds of work you don't really do. Especially if you work a typical, I don't know, nine to five grocery store or factory work or whatever, this is not really part of your life. It's just something you go to and then you go home. A PhD or any academic work is part of you because it's an interest of yours, right? And the way that you work with this reflects, in many ways, on you as a person, or at least it feels like it.” (Susan, PhD student)

The above quote belongs to Susan, who explained how strongly members of the scientific community identify themselves with their work. But what, then, counts as the right way to work, or even the right way to be a scientist? When asked about PhD students’ perception of a good scientist, David said:

> “I don't feel we actually talk about what a good and a bad scientist is.” (David, PhD student)

Despite a lack, for at least some students, of explicit and open discussions, PhD as well as master’s students gave me consistent answers to the above question, which indicates that such ideas circulate as discourses that are powerful precisely because they are taken for granted. Some of their descriptions referred to the way of doing a job: being hard-working, skilled, well-educated in their field, being able to ask critical questions, and having research integrity. According to my informants, these features can be estimated by the number of published papers, the type of the journal that paper is published into, and where one’s name is placed on the lists of authors. In other words, while participants described process-oriented qualities as a measure of scientific excellence, they also mentioned publication statistics as an output-based measure of success which has already been extensively problematised within the scientific community (Haiven, 2023, p. 153-154; Edwards & Askanasy, 2018, p. 167-168; Marques, 2024, p. 110-112). Interestingly, qualities of a good scientist often suggested a special kind of person rather than a special kind of professional. The most frequently mentioned characteristic was being smart, but students also told me that a good scientist should be curious, uplifting, imaginative, confident in themselves and their place within the scientific community, mentally stable, extroverted, and, most of all, passionate about science.

What almost student informants had in common was precisely the attitude towards science, which they described with words such as “excitement”, “care”, “love”, and “passion”. They like to think and discuss science in general, are fascinated by its advancements and enjoy reading and learning about recent research and talking about it with their colleagues. They are curious and find learning about “how things work” fun and interesting, and at the same time enjoy the idea that they are actively playing a role in science and contributing to the general knowledge in science by working on their own project (as opposed to master’s students who primarily valued contributing to the public wellbeing instead). Indeed, identifying as a scientist is an important part of who they are, although many of them struggled with reducing their whole being to only being a scientist. They put high expectations on themselves, and they are prepared to invest considerable amounts of time and energy in science and their projects. Many times, they compared working in the lab with problem solving that can be both engaging as well as frustrating. Richard described his colleagues like so:

> “Many PhD students like to read papers. They like to understand how things are working. They ask questions. They are looking at all these different fields. And I think that's how you become such an impactful scientist: you have to care about science.” (Richard, PhD student)

To be regarded as successful, one needs to express these personal characteristics in a culturally pre-defined way. As Illouz (2012) explains: “What in common psychological language is called ‘insecurity’ points to two sociological facts: (a) that our worth and value are not prior to interactions and are not *a priori* established but are in need of being ongoingly shaped and affirmed; and (b) that it is our performance in a relationship that will establish this worth” (p. 114). In a culture where everyone is trying to present themselves in the best possible light according to the shared ideal, it is easy to feel inadequate. Three out of ten PhD students that participated in my study told me they identify with imposter syndrome, which makes exposing themselves to ask questions even harder under the pressure to perform in front of the PI or those who look up to them. While being in the liminal phase of rite of passage to become scientists themselves (Zhang, 2021, p. 10-12), they are responsible for mentoring master’s students as well and thus contribute to a continuous reproduction of research culture within their lab. Elizabeth reflected upon being a supervisor:

> “When I'm teaching one of them something or just talking about something, the way they talk to me is it's like, they think I know *everything*, and of course I know things, but when I don't know something, they're like: “Oh my gosh, well, *I'm* never going to figure it out!”, and I'm like: “No, just because I don't know, it doesn't mean you can't figure it out!” (Elizabeth, PhD student)

Being members of the scientific culture, PhD students share these expectations to perform and engage in a process of continuous self-evaluation (Illouz, 2012, p. 122). In being so high, the expectations might discourage everyone who is not able to identify with them, or who doubts that they will be able to develop these personal traits during the 4-year program. As Thomas said:

> “I hope that once I go through the PhD process, I'm going to be a well-educated person in my field, so then the self-doubt goes away. So I'm taking this four years of a PhD as a grace period. So it's okay to feel bad during this time, but if I come out on the end and still feel I'm not ready to be part of this field, I might have to reevaluate if I can be a PI.” (Thomas, PhD student)

Instead of being recognised as a good scientist by their membership in the scientific community or through a professional title, “the rituals of recognition must here acknowledge the ‘essence’ of the self” (Illouz, 2012, p. 114). Thus, science is not just a job. Through the process of training, students not only learn the appropriate ways of how to act like a scientist, but also how to feel like one as well, and to be recognised as such by others (Ahmed, 2010, p. 36). For its practitioners, science should be regarded as a personally fulfilling and meaningful practice, associated with pleasant feelings, and encouraging the desire to be in its proximity. As Ahmed notes, “it’s not just that groups cohere around happy objects; we are asked to reproduce what we inherit by being affected in the right way by the right things” (Ahmed, 2010, p. 45). Time and time again, PhD students like Barbara told me that the main reason why they decided to do a PhD was because they loved science and found the project on offer fascinating:

> “I'm really loving it. I have times where I'm coming home and not thinking about science, but there are days where it's *all* about the science, and I'm really enjoying it.” (Barbara, PhD student)

For most PhD students, biomedical science is a happy object (Ahmed, 2010, p. 21-22). The fondness for it is an important motivational force that directs PhD students pursuing their career. Sharing knowledge and passion seemed like major contributors towards keeping their motivation alive. All my informants valued collaboration and emphasized its importance for promoting qualitative science within preclinical research. To William and his colleagues, opportunities where people feel free to share and discuss their projects with others, such as meetings, workshops, and courses, felt stimulating:

> “Even though we're not doing the same thing, it feels like we're in it together more.” (William, PhD student)

In being a commonly shared passion, the love for science enables individuals to develop a sense of belonging and solidarity with others in a community (Ahmed, 2010, p. 36-39). Scientists working on the same topic can relate to each other, affirm each other’s expertise, value, and place within the scientific community. This follows Illouz’s argument that in modern times, “recognition is not something that is given one and for all, but rather a complex symbolic work that must be maintained through repeated rituals and which can threaten and engulf the self when not properly executed” (2012, p. 123). When discussing a positive experience that she had at a conference, Jessica said:

> “I don't think I was that passionate about my project for a while and then I went [to a conference] and I got better because I had this little kick of hey, people are actually interested in this. And then I just hope for the next moment I'll do this again.” (Jessica, PhD student)

However, sometimes PhD students are not able to feel what they imagine that others feel to the same extent, or at all. In such cases, they become affective aliens (Ahmed, 2010, p. 42).

> “I feel bad sometimes because I'm not like super excited, super like: “Oh, I know that I want to be a scientist for the rest of my life.” Some people just know that this is exactly what they want to do. And I enjoy this. I think it's cool. But I don't know how I want to use it.” (Karen, PhD student)

Despite liking science, Karen believes her feelings are not strong enough, and feels different from her colleagues because the thought of being a scientist does not appear as attractive to her as it

“should”. Not all my informants felt doubtful about or questioned their value as scientists if their excitement about it was not as outwardly intense as others’, especially if they felt their other interests lie outside of academic research. Still, Karen’s words exemplify how strong the norm to not only feel a personal attachment to work, but to express it as well, is within the scientific community. But how, then, is failure perceived in light of such highly idealised perceptions of work, together with high expectations for professional achievements and personal investments?

5.2. Making sense out of failure

The following subchapter is divided in two parts. First, I explain how PhD students define failure. By describing its broader context, I also explain the ways in which dominant ways of perceiving failure affect the ways in which students relate to their work and to themselves as experts in their field. In the second part, I pay close attention to the ways in which students make sense of their lived experiences of failure. I define factors impacting the ways in which students define and conceptualize something as a failure and provide my own suggestions for how such complexity could be understood in future of the social science research.

5.2.1. Defining failure

No matter how different their experiences were, there is one thing that all my informants agreed upon: failure in science is common. It is an inherent and inseparable part of scientific research that happens all the time and to everybody. On one extreme, there was a consensus among my participants that serious deviations from values and ethical codes of the scientific community, such as falsifying data or treating animals unethically would mean failing as a scientist. What failure represents in less obvious cases, however, turned out to be a much more complex matter. In general, my informants agreed with Thomas:

> “I think when you fail it's something bad because you couldn't achieve what you wanted to. And that's how I think about failure overall: when you're not able to meet an expectation. My own expectation, someone else's expectation.” (Thomas, PhD student)

Like others before me (Edwards & Ashkanasy, 2018, p. 167; Kessler, 2023, p. 124-128), I found that students perceived failure as an inability to meet expectations or realize their goals, which referred to a wide range of personal objectives: from publishing in a desired journal, succeeding in acquiring relevant results from the experiments, being on track with plans for their projects,

conducting qualitive and ethical science, or even presenting oneself in line with desired personal characteristics. As previously demonstrated (Gross, 2023, p. 406; Kessler, 2023, p. 119-421), I found that the notion of failure as negative was the most common among the varying accounts that students shared with me.

> “Research is so much up and down. Sometimes it's great. Sometimes I have a super bad day and *nothing* works. I had days when the machine did not want to cooperate with me at all. I was so annoyed. And it's just a bad day. I was literally lying down on the machine. If I could kick it, I probably would. I was so mad, but then I know the next day, one little thing works out and your entire mood shifts. And I think that's how it is.” (Jennifer, master’s student)

Jennifer’s words are a good summary of the way failure was perceived and experienced among my informants. Even though failure occurs often and in many forms, it has the power to surprise and disappoint, as it opposes the imagined outcome that students hoped for. As such, it represents the gap between the ideal and lived experience of science (Schaefer, 2021, p. 84-85). Thus, it is regarded as undesired, unfortunate, as a frustrating devaluation of one’s efforts, and as never coming at the right time. It is the randomness and uncertainty of failure that raise the possibility of self-critique and moral judgements (Schaefer, 2021, p. 84) through questions like: Why me? Why this experiment? Why now, instead of yesterday or tomorrow? As Barbara explained:

> “I really felt that it was somehow unfair, because that's another part about science: sometimes you have *luck* with the projects, the projects just work, and other times you don't.” (Barbara, PhD student)

Her quote shows how the contingency of failure moves the latter from the realm of science to the realm of morality and justice, as objective scientific reasoning of failure is insufficient. As Illouz (2012) notes: “When suffering cannot be explained, we suffer doubly: from the pain we experience and from our incapacity to bestow meaning on it. Thus any experience of suffering always points us to the systems of explanation that are deployed to account for it” (p. 16). Failure needs to be incorporated in the framework of sensibility that students consent to as part of their training, which in the case of biomedicine most closely resembles Schaefer’s (2021) ascetic meritocracy (p. 89-90).

The main characteristic of ascetic meritocracy is that it orients the narratives surrounding failure away from its causes to the future (Schaefer, 2021, p. 88), which in this case may be the publications required for obtaining the PhD title. While unexpected outcomes are thought to be the foundation and the purpose of scientific endeavour (Firestein, 2023, p. 416-421), preclinical researchers are oftentimes denied the possibility to publish them in a scientific journal, because the current system of publishing does not encourage publication of negative results. And yet, scientists must publish papers (Marques, 2024, p. 111). PhD students are required to do so by the faculty. Senior researchers are required to do so by the current system in which research is funded. Steering into the unknown without any assurance of finding something that would be considered “interesting” or “important” is risky, and thus, it is seldomly done, as Firestein (2023, p. 420-421) and Gross (2023, p. 409-410) criticised as well. Some of my informants indeed expressed disappointment for not being able to engage in research for its own sake and for the mere love of science. David sighed:

> “PI is the boss in the group, so if the thing that's discovered isn't in the right direction that we want to go, then it's just: ‘No, we don't do that. Try again and follow a different path’.” (David, PhD student)

It is then no wonder that failure is perceived as success’ opposite, instead of its complementary part, let alone a complement to success. It is taken as a bad sign and as a threat that a PhD student would not be able to obtain their PhD title, or – to paraphrase both Weber (1963, p. 149) and Schaefer (2021, p. 88-89) – achieve their salvation, the hope for which legitimizes the hardships experienced during the PhD studies (Schaefer, 2021, p. 89). As Elizabeth observed:

> “When everything is failing, let's say, or you have your plan and it's not as you expected, then you feel more this pressure because it's like: “Okay, I need to do this to get this requirement”, but if it's not going well, then you're failing in this process and there's something saying to you: “Oh, you won't get it.” (Elizabeth, PhD student)

5.2.2. Types of failure

As most students initially placed failure merely in opposition to success, failure in the context of academic preclinical research can be many different things with diverse consequences and associated strategies for its management. Scientific research is a dynamic process that involves a

wide range of activities, complex net of social relations and diverse settings, so it is not surprising that all my informants stated that many things can go wrong in the lab. The way those things are interpreted, however, depends on the context in which they occur, and the perceived consequences that follow. As Illouz explains, ways for reasoning failure “differ in the ways they allocate responsibility, in the aspects of the experience of suffering they address and stress, and in the ways in which they convert (or not) suffering into another category of experience, be it ‘redemption’, ‘maturation’, ‘growth’, or ‘wisdom’” (Illouz, 2012, p. 16). Not all failures rise in significance to the level of cosmodicies.

During my interviews, I learned there are many factors that influence whether an experiment outcome is interpreted as a failure or not. This depends a) on the level of an experiment’s complexity in terms of required knowledge or skills relative to what is expected from a PhD student; b) on an experiments’ size in terms of people who are affected by it, invested money, time, and sacrificed animals; and c) on how often the negative outcome occurs. Since these criteria for defining failure intersect, it is difficult to compare specific failures to one another, especially because their consequences for PhD students vary just as much. Those consequences depend on the amount of time left until the defence, support received from peers and supervisors, and available resilience-building coping strategies. Specifically, my informants differentiate between making a mistake (a mishap) and a failure. While mishaps oftentimes lead to temporal feelings of inadequacy, anger, self-doubt, self-blame, shame, or disappointment in oneself (Edwards & Ashkanasy, 2018, p. 170), their consequences are thought to be milder than those of a failure. Students think of mistakes as minor inconveniences, insignificant enough that they are not worth sparing much thought on. Because they do not point to a gap between an idealised perception of the scientific research and lived reality, they do not require explanation and justification with the moral terminology of cosmodicy, as their insignificance rejects serious critique (Schaefer, 2021, p. 84). On the other hand, failure signifies something more definite and final: the involuntary decision or a conscious choice to give up the current plan, and a threat to future possibilities (Mica et al., 2023, p. 8). Jessica explained:

> “Once one stops putting effort into something because they are tired or it doesn't work anymore, then it's failure for me”. (Jessica, PhD student)

My participants described two broad types of experimental failure. If an experiment contains a technical error (such as a machine that was not working properly), it might not generate expected knowledge. Although technical skills could be improved with intensive troubleshooting, some informants perceived such experiments as useless and meaningless, and a waste of time, effort, and resources which were put into it. It was oftentimes conceptualized as unjust bad luck that evokes frustration or disappointment by the thought of how the experiment could and should go. On the other hand, experiments sometimes fail due to biological causes that have not been considered nor understood before. When previous knowledge turns out to be unreliable or insufficient, the research project that depends on it requires readjustments and discussions in formal or informal settings, such as lab meetings, supervision sessions, or casual conversations with colleagues. There, the opportunity for generating new understanding and sense-making occurs, and yet, my informants did not share Firestein’s (2023) excitement for the “real failure” (p. 417). In fact, they all agreed that the worst possible scenario would be realizing that their primary hypothesis has failed in case it would threaten their chances for graduation.

The last kind of failure that all PhD students talked about was personal. Considering the dominant “belief in personal responsibility, free choice, and equal opportunities” (Schaefer, 2021, p. 89) within the scientific community, this is hardly surprising. Such “personal failures” pointed to instances when an individual’s sense of self-worth and adequacy was undermined because they believed their expertise was insufficient. It was oftentimes described as painful, associated with self-blame, shame, and insecurity. Personal failure is communicated to only those colleagues in the lab that the individual feels closest to. Given that my informants identify as ambitious and independent, practices of comparing to one another are very common and frequent. Almost all my informants said they compare their achievements with those of their peers, struggle with anxiety, or identify themselves as having imposter syndrome, which matches conclusions of other researchers (Haiven, p. 355-358; Marques, 2024, p. 112).

Considering the above, it becomes clear that failure is not just an objective event, but that it depends on the way we interpret it and consequently experience it on an emotional level (Kessler, p. 124-128). I conclude that the border between failure and success is blurred and that searching for it is not a productive way to understand perceptions of failure within the scientific community. Many previous researchers sought out ways to move beyond the “success/failure binary” (Mica et al.,

2023, p. 5-11), and I propose that research failures can more accurately be understood on a continuous spectrum. There, the context in which failures occur pushes them closer or further away from being perceived as impactful and in need of alternative reasoning and management. In what follows, I will thus address the latter in greater detail.

5.3. Strategies for managing failure

The following subchapter is dedicated to presenting two main strategies that PhD students used for coping with failure in the context of their work. On one hand, they oftentimes relied on social support by sharing their experiences with other members of the scientific community. Sometimes, however, circumstances undermine the opportunity for strengthening support, and I will address that as well. On the other hand, students commonly compensate for encountered failure with overtime work, which in some cases endangers not just their wellbeing and health but also their positive perception of the academic research.

5.3.1. Sharing experiences of failure

As I demonstrated above, romantic and idealised perceptions of science deny failure its rightful place in research and present it as individualised and unusual. The way failure is perceived and managed by different actors in science can play an important part in the affective conversion of science from being exciting, into being disappointing, draining, or meaningless (Ahmed, 2010, p. 44-45). Because failure is an unavoidable part of scientific research, a paradox occurs when it is conceptualised as personal and given moral connotations. My informants used a wide variety of words to express their feelings when things do not work the way they planned, here summarised as apathy, shame, anxiety, anger, sadness, confusion, disappointment, and insecurity. Failure as an unhappy object (Ahmed, 2010, p. 44) resides within a happy object, science, which cannot be “purified” of the former. In what follows, I will present two possible outcomes to such contradiction.

The first one occurs when an individual performs emotion work to show their passion about their project, whether or not they actually feel it, and re-align with their affective community and its cultural norms. After I asked John, one of the master’s students, if how one presents themselves in the lab is important, he answered with:

> “Yeah, I think yes. In a way that you're hard working, that you're not like sick of everything, sick of research, sick of doing experiments. I'm not going to be in this lab forever, so I will need to have to find another job and you want them to recommend you to other people.” (John, master’s student)

The ability to present yourself as confident, professional and happy with your work does not only affect your social relations with other colleagues in the lab, but also possibilities for your future career. Managing emotions and responding appropriately to instances of failure that bring about frustration, sadness or disappointment thus appear to be important parts of the professional identity of a scientist. Students choose different strategies of how to manage their emotions to fit in the lab (Ahmed, 2010, p. 42-43). Trying to keep one’s expectations low, developing different attitudes towards failure, turning to therapy, asking friends or family members for a conversation, and taking time for themselves were all mentioned by my informants. Turning to lab colleagues was one of the most commonly mentioned strategies for coping with failure, as they are the ones that are able to relate to students’ experiences to largest extent. As Linda, a master’s student, remembered:

> “One of the persons in the lab started crying and they were in a really bad spot one really hard experiment didn't work out and she just came to us and she was like: “It's, it's done. It didn't work out”. And they started crying. You try to help, but you're also stressed, but you're like: “Everyone needs to be in the same boat”, so you try to calm them as much as you can.” (Linda, master’s student)

This quote refers not only to the expression of solidarity, care, and ways of coping with disappointments, but also points to how deeply experiencing failure in the context of the lab can be felt. Like O’Shea (2023), my data demonstrated that it is important that students can rely upon “structural environmental safety, and community support” (p. 487). The latter includes positive affirmations of one’s work and status in the community (as opposed to one’s achievements) from the PI and other colleagues (Illouz, 2012, p. 120-123). In other words, a supportive working environment presents a safety mechanism that neutralises the experience of failure as a sign of future doom or an indicator of students’ professional inadequacy into a manageable scientific fact. As a result, one’s motivation for the project is less likely to be affected by periods of struggle. Offering emotional support is a common occurrence between students themselves. Indeed, PhD students clearly stated that they do talk among each other about bad experiences, struggles and

mistakes. The flat hierarchy among peers allows for that connection, and failure serves as a basis for strengthening the feelings of belonging and solidarity to their specific social group. Sharing one’s misery should be met with equal exposure of vulnerability to secure a power balance in mutual processes of receiving and affirming recognition and validation, to paraphrase Illouz (2012, p. 134). As Joseph stated:

> “It is tough for everyone, but in different ways.” (Joseph, PhD student)

According to Ahmed (2010), returning the feeling with the like feeling to other members of the affective community is key for maintaining one’s alignment to it. In this way, “good and bad feelings can be generative, even if they do not simply spread./…/Expressing bad feeling can even become habitual in certain times and places, as a way of belonging to an affective community” (Ahmed, 2010, p. 43). Expressions of solidarity and understandings between PhD students are manifested in circulating rumours, which expand the social boundaries of PhD circles both as a warning away from perceived negative practices to other PhD students and as a gate keeping strategy that sustains the recognition of their status compared to master’s students. Mary, a master’s student, described this trend like so:

> “I think PhD students are kind of forced by the society to tell other people: “Oh my god. It's so hard”. I don't hear a lot of people that are doing the PhD saying: “No, it's great. It's super fun”. And I think that's like a society thing. It's general, that if you're a PhD student you *need* to be a little bit depressed and have mental breakdowns.” (Mary, master’s student)

Sometimes, regardless of how supportive other lab colleagues might be, sharing experiences of misery can have its downsides. As Ahmed (2010) explains: “Good and bad feelings accumulate ‘around’ objects, such that those objects become sticky. Objects become ambivalent in the conversion between negative and positive feeling states: ‘happy objects’ can become ‘unhappy’ over time” (p. 44), as so can academic research among PhD students. Joseph explained, the loss of passion for science demands mourning, not only for the disappointed student, but also for their colleagues who look up to them:

> “When I started in the lab, my two colleagues are what I want to be as a scientist, both of them. They have passion, just a huge amount of knowledge. Any problem I ever went to them with, they always know how to help me. I don't know if it's academia in general or

> our lab, I don't know what it is, but you just see, every year, they're slowly worn down. Because then I look at them and I say: ‘Okay, you’re my standard, and if you don’t think you can do it, then I don’t stand a chance.’” (Joseph, PhD student)

Accepting that one’s initial enjoyment for a research project had declined, was experienced with great anxiety. It is not only that modern beliefs in free choice and self-realisation render the struggling student entirely responsible for their own misery (Illouz, 2012, p. 8-9). For William, the misery also triggers his anxiety because he knows it is deemed as problematic in his professional field. In Ahmed’s terms, unhappiness with research thus makes William question if he is going in the right direction (2010, p. 48), and if there is a place for him among other scientists. As student tries to develop more optimistic attitude towards science, passion for it “becomes a technology of self-production, which can intensify bad feelings by keeping them on hold” (Ahmed, 2010, p. 43). In William’s words:

> “For me, what is stressful is not enjoying the journey [of doing a PhD]. To be really obsessed or focused on stress, and not enjoy the process: that makes you feel more stressed because *why* then I do that? I'm not doing this to become a PI. I'm doing this because it's fun, or because it was the best situation I can have right now. And I think it's fun and I like it. And if I don't like it anymore, I’m not enjoying it.... Even if it's a job: it's not like you are having fun all the time, or you are doing what you would like to do the rest of your life. But that stresses me: the times that I realize that I'm not enjoying it, or I don't want to go to work, or I don't want to do this, or I don't want to do the other thing.” (William, PhD student)

As Ahmed notes, “We are affirmed by happiness: we go along and get along by doing what we do, and doing it well. Happiness means here living a certain kind of life, one that reaches certain points, and which, in reaching these points, creates happiness for others” (Ahmed, 2010, p. 48). Given the extent to which PhD students’ identities are constructed around science, it is not surprising that sometimes the loss of passion for science can be traumatic, as it undermines the sense of who a student is. William finds his loss of passion uncomfortable, as it undermines his sense of ontological security, and simultaneously blames himself for not living according to the modern imperative of self-realization (Illouz, 2012, p. 99). When a supportive and encouraging environment is not accessible, apathy can undermine fondness about science and research and demotivates students in their academic careers. This is the second outcome of the paradox

described above: it can make people leave. In what follows, I will direct my attention to the barriers which make it hard for researchers to relate to one another, share their experiences, and to build supportive working environments.

5.3.2. Barriers to sharing failure

> “You could be the dumbest postdoc, but the master’s student will still revere you as higher in the hierarchy, and will think about that.” (Mary, master’s student)

Like Mary, other researchers pointed to the hierarchical relations within the research labs. Scientific training is based on the system of apprenticeship (Zhang, 2022, p. 3) and structured around a specific set of rules of social conduct that make interactions between individuals with different statuses predictable and organised (Illouz, 2012, p. 29). Depending on one’s level of education and the extent to which one’s skills are developed, an individual assumes a clear social position in relation to others and is expected to conform to and perform in line with the set of norms, specific for their role (Zhang, 2022, p. 2). Compared to master’s students, who are oftentimes doing their first lab project for their thesis, PhD students are expected to be able to work with greater independence, take responsibility for planning their experiments and manage more advanced techniques, all of which were also important motivational factors for starting a PhD program among my informants. However, struggling with what is considered “easy” is not easily justified either by themselves, or by other members in the lab. Robert, a master’s student, described his disappointment and confusion with one of the PhD students that failed at a delegated task:

> “I would tell them: “Oh, yeah, I think you do it like this”, and then they would do it wrong, and I'm like: “How can you do it wrong? You're smarter than me, you know these cells more!” It's not like they would be new to the lab or anything, they're a PhD student!” (Robert, master’s student)

Although overcoming difficulties and confidently proceeding with work may be easier when PhD students turn to their supervisor for help, the extent to which they feel comfortable to do so varies greatly and depends on the established relationship with the supervisor, the latter’s availability, and their active expressions of support. PhD students proved to be ambitious and self-critical, and thus, turning to someone with higher status and greater power for help might indeed be intimidating. Self-doubt due to the belief that a student is not living up to the expectations, fear of being perceived

as stupid and disappointing can postpone the request for needed consultations. As Marques (2024) argued, “we cannot risk failing, voicing opinions and new ideas, giving and receiving feedback, if it is not safe to do so” (p. 111). It is usually easier to “troubleshoot” with colleagues instead, but admitting a mistake or lack of knowledge is not easy even in this case. Jessica explained:

> “The failures I probably talk about the most would be experimental ones. For example, I tried to measure this and it didn't work or I tried to do this and then it didn't work. Because I think these are failures that don't reflect about you. These are just failures in science. If I feel that I failed in a meeting, if someone asked me a question and I don't think I answered it well, or maybe I gave a presentation and I don't think I did a good job. I would say personal failures - I don't like to share those as much.” (Jessica, PhD student)

Sharing personal struggle with their studies would expose the mismatch between shared cultural ideal of a good scientist and the lived experiences of the PhD student, who would risk appearing as personally inadequate. Since the value of each student as a scientist is performatively established through continuous demonstration of their skills and suitable personal traits, exposing inability to meet the expectations undermines the sense of themselves, rather than only their skills or behaviour (Illouz, 2012, p. 122-130; 142-149). As Thomas told me:

> “I don't think there is a shiny PhD student where everything goes perfect. I think everyone is in the end struggling from the same things. Some people are just better at hiding than others. Some are maybe a little bit more lucky than others with projects. But that's something that is really not well communicated, I think. Because it would show that you're weak. I think for some people it would give the impression that they're not capable of it.” (Thomas, PhD student)

Some students noted how presenting negative results is not a common practice in the lab, and it usually happens only when a person has no other choice. My findings thus match those of Edwards and Ashkanasy (2018) as they noted: “Although all employees encounter failures at some point in their working lives, we suggest that academics are especially vulnerable in that they receive critical feedback and scrutiny of their work from many different sources on a regular basis, which in turn can trigger negative emotional responses” (p. 167). Students can learn to disassociate themselves with such ways of experiencing failure through time when they are encouraged to so and guided

throughout their education by an example of supervisors’ attitude. Received support, accumulated experiences and confidence usually mean that higher-year students are more resilient to failure in their emotional responses, and more prone to examine it from scientific, rather than a self-critical angle. The following quote illuminates that well:

> “I know I shouldn't let criticism about my work directly affect me as a person, but I feel like me identifying as a scientist is my whole personality. So when I'm doing a bad job at work, it feels like it's also me. I'm slowly starting to separate this, but I can't do it from today on and then everything's fine.” (Elizabeth, PhD student)

It is important that a student is continuously presented with evidence of being supported and secure in when they encounter problems. Especially for unexperienced ones who do not yet trust themselves, providing a sense of understanding for their struggle might determine the way they approach they work and develop an attitude towards the field. There, those who are not able to rely on the dense safety net appear to be more vulnerable for the risks that encountering failure might bring, which forces them to invest more thought and energy in attempts to avoid them, or altogether prevents them from engaging in “risk play” (O’Shea, 2023, p. 487). Acknowledging that not everybody has the same opportunity to succeed, and identifying those subgroups of students whose social position do not allow them to develop resilience to the same extent is thus an important part of supporting both new generation of scientists. Those who might not be able to develop a sense of belonging to the scientific community and perform their expertise due to “markers of social oppression and difference” (Haiven, 2023, p. 349) are especially vulnerable. While this topic exceeds the scale of my research, my data show that international students, those with family, and newcomers might be less resilient to failure. In this respect, as Appadurai and Alexander (2020) noted, failure can be perceived as a privilege that not everyone can afford (p. 119). Reflecting on his work ethic, Michael pointed to how, despite prior experience in a different high-intensity field, entering biomedicine as a student undermined his sense of security and how this in turn negatively affects his work-life balance and wellbeing:

> “It is easy to tell people starting in a line of work, especially if you have been doing it for a long time, to relax, have fun, and not worry. But you can say that because you have gone through all that is probably needed to get to the place where you started. I mean, I’m stressing like hell and spending 14 hours away from home. Will it be worth it in the end?

> Probably not. But that’s how I was at the beginning of my other career, working 14 hours a day and stressing [about doing your best].” (Michael, masters’ student)

There is another reason for why promoting welcoming, democratic, and safe working environment could be beneficial for constructive coping with failure. Consistently, my informants emphasized the need to feel comfortable and confident enough to ask for help, especially if their colleagues are already overworked and asking for help would thus feel like posing additional unnecessary and unfair burden on them. It seems that expectations of one’s performance played a less important role than did feelings of belonging and being accepted. I thought students would be likely to ask questions in the beginning of their project, when no one expects them to know everything, instead of later when they already are expected to know how to do certain things, but I was wrong. As John explained, feelings of belonging are far more important than the high expectations imposed by the faculty or scientific culture:

> “Now it's a bit easier [to ask lab colleagues for help] because for me it really relates to the level of intimacy or connection that I have with the people. And that for me develops. And also at the beginning, I felt very unexperienced, so the questions that I would ask were more on a basic level, and I would feel a bit pressured on not knowing those things”. (John, master’s student)

In the above two chapters, I presented the act of turning to other members in the scientific community and sharing one’s experiences of failure as an important strategy for coping with failure. In what follows, I will present the second one: compensating for encountered failures with work.

5.3.3. Coping with failure through work

> “I think the people I like the most are the ones who do a PhD because they love science, and they love research, and they are willing to suffer that so they can go on and contribute to the field and contribute to discoveries.” (Susan, PhD student)

According to Schaefer, cosmodicies, serve as a justification of social inequalities and unequal power relations (Schaefer, 2021, p. 88-89). On the other hand, in its belief that encountering misery and difficulties builds up character and leads to promised success in the end if one is strong enough to endure them, finalism (Schaefer, 2021, p. 89) in science also normalises and perpetuates harmful

working conditions, ruthless competition and overworking, since it pictures sacrificing oneself for the sake of science as honourable or even romantic.

Ascetic meritocracy anticipates that living according to the social norms and rules would result in being rewarded in the future (Schaefer, 2021, p. 88-89). In the context of biomedical research, an individual has the agency and moral responsibility to lead their project in the right way. Such way of perceiving the world manifests in valuing hard work, persistence and making sacrifices for the sake of future compensation (Schaefer, 2021, p. 89) in the form of the PhD title and better career options. As Joseph reflected:

> “You always have the notion that if you work really hard, you'll see results in life.” (Joseph, PhD student)

In line with Schaefer’s description (2021, p. 89), I found that working hard and letting others know it seems to play a part in being respected in scientific community. Laziness is frowned upon and anxiety of being perceived as not working hard enough was common, since it could signify the lack of dedication or passion to the project (Ahmed, 2010, p. 36-44). Another informant explained with frustration how failing experiments prevented working long hours in the lab:

> “I really wanted to do more, and then you cannot, so that's also really bad. It made me feel really bad. So in terms of spending hours and hours and leaving [the lab] at nine or seven or six, it has not been my case. But at the same time, I hope it will be, because that means that I’m doing a lot of stuff, right?” (David, PhD student)

While failure can sometimes block the ability to work as in above case, it usually demands repetition of an experiment, and such additional work slows the project’s progress down. For most students, a 40-hour week is impossible. Staying up in the lab from morning until evening and going there even for the weekends and holidays to compensate for the “lost” time is considered a normal part of the PhD experience and a common strategy to cope with failure and securing the chance of successfully completing the education in time. Should it be some other occupation, such working hours might be regarded as exploitation instead of accepted reality, an outcome of personal mistakes or even a source of pride. One of the clearest explanations for being overworked was provided by Jennifer, a master’s student. The mere scale of the project that she was expected to

complete in the given time to submit her thesis left her no other choice but to work continuously far more than what she was supposed to:

> “It's not an environment in which my supervisor, for example, is telling me: ‘You have to do this, this, this, this, you can't leave before.’ Because they're always like: ‘Oh, don't worry. You can go home whenever you want.’ But then, I can't. And also, since it's my project, I want to feel like I do it.” (Jennifer, master’s student)

Being overworked is an outcome of adjusting oneself to the generic system that does not recognise the unique situations that every student faces. With the hope of succeeding in the end, students do not only sacrifice their free time by compensating for encountered failures, but also the life opportunities that free time enables: having a family, strengthening connections with partners, relatives and friends, finding ways to maintain good physical and mental health as well as to express themselves and personally grow. As William stated:

> “It's very hard to combine [personal life with work]. And then I asked myself, does it even pay for it? Does it even pay? Because it doesn't pay. Even salary wise: I won't even get rewarded financially for this extra time I'm trying to make something work. Imagine I have a family. I deprived them of my time, and yet I deprive them of a lot of money. I don't have a lot of money to compensate for the time I deprived them.” (William, PhD student)

Exactly these personal relations and hobbies were the most commonly mentioned strategies that allowed for performative restoring of one’s sense of social worth (Illouz, 2012, p. 119) after being undermined by failure or criticism. The problem, however, occurs when students feel pressure to compensate for the failure on the account of limiting the very things that motivate them to proceed with their work, which can negatively affect their wellbeing and health. Another manifestation of consequences of focusing solely on work without perceiving it as rewarding is evident even from the differences in evaluations between full-time and part-time PhD students, as acknowledged by the faculty administrator:

> “Part time PhD students are far less stressed than full time PhD students. I think a big part of the reason for that is that part time PhD students know that their PhD project is - let's just say - not *that* important, it's not everything, because they know: “Okay, I'm working part time clinically, I also have this, I'll also have that”. Even though they have even more limited time

> to work on it, they won't get *as* stressed about the PhDs project as somebody else. And I guess the extension of that would then be to try not to invest yourself that much into it that it ends up hurting yourself. Even if you really want this to happen, you can only do it if you have the ability and to actually carry through with it. So, while I wouldn't say that it's not serious, try to conceptualize it not so much about whether this project succeeds or fails is a question about whether *I* succeed or fail as a person. That would be the gist of it, if I'm trying to coach someone through a difficult time in their PhD studies.” (James, Faculty administrator)

In April 2024, the student magazine *Lundagård* published a short article addressing the challenges that PhD students at Lund University face. Based on a recent survey, Lund’s Doctoral Student union and The Doctoral Student Guild believe that “It’s well known that it is common to experience mental health problems during a PhD, and problems with supervision, career worries, concerns about residence in Sweden, language difficulties and work-life balance have also been highlighted. Consequently, PhD students often struggle with day-to-day tasks, needing sick leave, and even wanting to quit” (p. 26). As stated, the study illuminated “important relationships between mental health and supervision satisfaction, comfort with Swedish, and social support” (Lundagård, 2024, p. 26). Such support is offered by a doctoral representative known as ombudsman (DOMB), but, as the article noted, it is impossible to expect that one person would be able to help 2800 PhD students. Indeed, some of my informants have never heard of them. While feelings of being unsupported by the faculty were not shared by all of my informants, some expressed doubts that anything would change even if they did try to reach out for help:

> “People always think that University is this place where you have the freedom to research what you want. You have this freedom in schedules, you don't have this rigid company schedule. And people don't understand that actually then, because you don't have all that structure, you are somehow also lost when your rights are not there, when you are working over hours, or when people tell you less nice things. You don't have access to anyone to complain” (Elizabeth, PhD student)

Regardless of their love for science, my informants were truly bothered by such normalised ways of working. My findings agree with those of Marques (2024), who remarked that younger generations increasingly value work-life balance (p. 112). As a consequence, students are having a

hard time subordinating themselves to the ascetic meritocracy, prevalent in the faculty and the scientific culture. More than 20 years ago, a former dean of the Faculty of medicine explained in his interview that “The pace of the research has somehow slowed down. An important reason is of course that the social pattern has changed, many younger people have to go home at 17.00, often stopping by the kindergarten” (Westling, 2001, p. 165). My data also reveal that romantic values, such as authenticity, freedom, sensitivity, expressivity, intuition, self-realisation and personal growth (Illouz, 2012, p. 9) seem to be increasingly relevant, and might indicate an ongoing shift from ascetic meritocracy to romantic inspirationism, “dating back to at least half a century” (Schaefer, 2021, p. 82). Not living according to one’s values, especially when an individual is highly idealistic, can be hard to take. It might feel emotionally draining, unrewarding, and unmotivating not only for PhD students, but also for those who are considering taking up this position. As Michael explained:

> “It's very important how groups are, that they have the environment when you feel comfortable where you are, and I really value the work life balance. I think it's so important. I think it's absolutely ridiculous to... You can't really perform at your best if you are just overworked and you're in the lab all the time. And also, I mean, I love research, but I love my other life more.” (Michael, master’s student)

I found that the bad reputation, that doing a PhD could and oftentimes does make students depressed, burn out, and drown in their work, is a very common rumour among master’s students. It is powerful enough to make academic research an unattractive career option. It was remarkable how often master’s students told me horror stories about doing a PhD. Usually, they revolved around a lack of support from supervisors, or poor mental and physical state of burned-out PhD students. Because of them, students like Patricia were considering doing PhD only because it might lead to better career options in the industry, rather than believing the experience would be enjoyable:

> “Something I have both seen with my own eyes and heard a lot is that academia is a very toxic culture. Perhaps the people who are in academia never intend to be toxic, but the circumstances they work under leads to them having to focus so much on their own and having to perform to get funding, to get results to be published. So that leads to everyone just focusing on themselves and not being very keen on helping others. So it's what I've

> heard and I feel like it's very demanding. Because you have to be super driven, you don't get a lot of help. Yes, in your own group you have your supervisors, you have the other people in your group, but let's say you're in a floor with five different groups, it's not very common, I've heard, that the other groups are willing to help you unless they got something back. So, that is why I don't want to continue in academia./.../ I just don't have a very good image of academia and what it means.” (Patricia, master’s student)

What’s more, competition, publishing, and being recognized as an authority within one’s field of focus within biomedical community might seem unattractive even to PhD students. While some of my informants were looking forward to becoming PIs themselves, most decided they do not want to be in such an unstable working environment any longer. Not unlike their colleagues at other universities (Nature, 2024, editorial), they aim for career in industry or elsewhere.

5.4. Role of the supervisor

In competitive environments, striving to meet the cultural expectations and embodying the idea of a successful individual is important for securing one’s status and associated benefits, especially for PIs, who have to fight for the grants to maintain their research. For it to be funded, it is usually of vital importance to not only present one’s work as smooth, promising and important, but to present yourself as important and capable as well (2023, p. 419-421). Thus, there is little room for sharing doubts and imperfections:

> “If you just look at people that are in general in leading positions, they're usually, or often, extroverts. They're often very self-confident from the start, maybe even a little bit narcissistic. It's just the behaviour that you see in leading positions that gives you the impression, if I ever want to go there, I have to be like that.” (Richard, PhD student)

The need of Richard’s PI to present themselves as successful can undermine the possibility for scientific discussions and knowledge transmission, and thus hinder the pedagogical side of PhD education. Recognising PhD students’ struggle and establishing solidarity based on shared experience would require exposing PI’s vulnerability and contesting the expectations of their own performance within the scientific community. Their need for exercising their “autonomy trumps the need for recognition” (Illouz, 2012, p. 134) from their students in light of other available sources. It also undermines the possibility of returning recognition back to supervised students,

which enables supervisors to exert "emotional domination" (Illouz, 2012, p. 138). Many PhD students told me that it is rare to find PI who would be both kind, supportive leader, but still publish well. Such individuals are usually highly respected and admired among PhD students, and frequently recommended to younger peers who are just applying for their positions. Oftentimes, still, the notion that a successful scientist should be independent, confident and dominant prevails. When discussing the shared experience of doing PhD, Susan observed:

> "You go to a conference and you talk with the PhD students. Most of PhD students feel *exactly* the same. And okay, *this* is the *pattern*. But for some reason, when you go sometimes to the postdoc phase, or mostly for the group leaders, that, we are just being dramatic. Everything is feasible./…/People are afraid to say, even in the group leader, in my PI stage, that they fail or that they fear that they are not good enough. And because of that, you put on this persona, that are so mean and so confident in yourself when you are actually not. And that also forbids you to do the step down that we talked about before, that "I have been through this", and that creates this barrier between students and supervisor". (Susan, PhD student)

Coping with failure as well as placing "hopes for happiness in the same things" (Ahmed, 2010, p. 48) as other scientists is learned, not naturally given. As Ahmed (2010) notes: "Happiness involves here the comfort of repetition, of following lines that have already been given in advance" (p. 48). While my informants all studied at the same program, the way they experienced the latter varied greatly. Not the specifics of each PhD project per se, but the ways in which they are approached seems to matter more. As Karen put it:

> "Your experience as a PhD student, it's directly linked to your supervisor." (Karen, PhD student)

Supervisors are not only relied on by PhD students for technical support, constructive comments, and professional discussions. They are also transmitting the cultural values and beliefs of scientific community to PhD students (Zhang, 2021, p. 10). Informants that described their PhD experience in the most positive way and their project with healthy measure of optimism and passion, were also the ones that were encouraged to perceive obstacles as informative lessons that would help them learn and grow as scientists. They learned from their PI that failures are safe, acceptable,

undisputable, and normal phenomena, which therefore do not require moral frameworks of reasoning (Schaefer, 2021, p. 84). After praising her PI’s supportive and optimistic attitude for their project even when experiments fail, Barbara said:

> “That really impacts, the attitude of everyone in the group and in our shared group meetings/…/thanks to my supervisor's attitude we can all gain from also our failed experiments. And it really makes you think twice about your experiments as well. Even if your conception is that it failed, you can learn how to see things from another perspective as well. So it's really, really helpful.” (Barbara, PhD student)

5.5. Role of the faculty

In March 2024, a *Nature* editorial criticised the resistance of PhD education to changes in assessments as compared to other levels of education. In its critique, it pointed to some good examples that the Universities should follow to improve research quality. As one of the suggested innovations that Universities should adapt, it discussed “PhD by publication, in which, instead of a final thesis on one or more research questions, the criterion for an award is a minimum number of papers published or accepted for publication” (Nature, 2024, editorial). It is important to understand that Faculty of Medicine at Lund University appears progressive in its approaches to training the new generation of scientists, when examined in the international context. To graduate, PhD students must fulfil the faculty requirements which state: “the doctoral student is generally required to have been involved in writing at least three papers, of which one must be published or accepted. The PhD student must be the sole first author on the published paper, as well as having a prominent position on the other papers” (Lund University, 2024a). In addition to this, the decision of whether or not learning objectives have been met relies on examining the “portfolio”, where students are demonstrate development of their expertise, as well as transferable skills, such as cooperation with the wider society and administration, organisation and leadership (Lund University, 2024b). This too is considered as progressive, as is the half-time, that is, a half-way presentation usually scheduled 2 years after the start of the PhD assessment, which is meant to additionally secure students’ ability to graduate (Nature, 2024, editorial).

Regardless of the above, many of my informants felt that the faculty’s criteria are better suited for clinical researchers. Clinical articles tend to be shorter, and since it is more likely that negative results would be considered as relevant, my informants think it is easier to publish them. As of

January 2024, the number of papers accepted for publication that the faculty requires for a PhD defence has been reduced from two to one.

> “We wanted to take the focus off of the quantitative side and bring it back more towards the quality of the individual papers. So therefore, the solution was simply to go from four papers [two of which need to be accepted] to three papers [one of which needs to be accepted], but you should have played an active part in all of the three remaining papers.” (James, Faculty administrator)

In this way, the faculty already recognized and addressed the pressure of publish or perish culture within the scientific community, and the negative consequences that it can have for PhD students’ performance as well as wellbeing. Some of my informants appreciated this change as the faculty’s support for the quality of the research. They also recognized that clear rules offer protection from work exploitation and additional motivation for proceeding with the project.

The faculty still requires *sole first* authorship in the accepted paper (Lund University, 2024a), which perpetuates the individualisation of scientific achievements and reinforces individual personal responsibility for one’s project, instead of distributing the risk of encountering failure, especially in the preclinical high-risk research (Firestein, 2023, p. 419-420). My informants complained that collaborations are not being encouraged by the criteria, as being a *co-first* author does not count for the *sole first* authorship requirement, regardless of the journal’s ranking or the scale of the work. The focus, according to some of the students, is thus hardly on obtained knowledge or capacity to contribute to its collective accumulation, but instead, on assessment of each individual’s achievements in an already highly competitive field.

The universal requirement additionally overlooks the wide variety of research topics, ways of doing research, or even ways in which PhD students attempt to meet the requirements for defence. Much like in other competitive environments in modern capitalistic societies, inflexible criteria presuppose that every individual has the same opportunity to make progress and succeed, if they are dedicated enough. This assumption is a defining feature of ascetic meritocracy which justifies inequalities of present-day academic environments (Schaefer 2021, p. 89) by ignoring the structural problems of the financialised university and rendering students responsible for their own fortune (Gross, 2023, p. 405-413). For PhD students, the perceived message is that meeting the faculty

criteria in the set timeframe is not only doable but that the opposite is not an option. Struggling with them leaves the question of “Why me?” unanswered and rises feelings of shame and alienation from the scientific community. As Richard explained when commenting on his halftime presentation:

> “Somebody started their PhD and did their halftime in 24 months. And then I start my own PhD, and at 20 months, I'm not even sure I will do my halftime. Do you understand? I'm not sure I will do my halftime by this time. I'll be like: “Ah, what's wrong with me? What's wrong? Everybody's doing their halftime at 24 months, at 23 months”. Yeah. There is this pressure. There is this self-pressure to get to this done. And if you don't do it, you feel like you're a failure.” (Richard, PhD student)

Unfortunately, Richard is not the only one who feels this way. Other researchers documented that “many young university students report a chronic feeling of failure, or of being destined to be a failure, or of being unworthy of or unable to return the ‘investment’ made in them by their families” (Haiven, 2023, p. 355). The belief in progress constitutes the core of ascetic meritocracy and is “the most vital doctrine of modern Western society” (Schaefer, 2021, p. 90). When the progress is not realised, individuals doubt themselves, not the system itself. Criticising the latter, Haiven suggests considering “the mental health epidemic among students as a crisis of the financialized imagination” (2023, p. 355), which implies “that many, if not most/…/will fail to be excellent, since not all can succeed when metrics measure deviation from a norm and ratings are by their nature hierarchical” (Haiven, 2023, p. 354). Far from simply promoting excellence, rigid requirements can instead result in stress or avoidance of exploratory science in cases when the student feels limited or threatened by deadlines. As David explained:

> “Something that everybody talks about in science is how you fail all the time and how it's expected for things to not work. And people recognize that when they talk about the discipline itself. But then when you're actually doing it and things aren't working, there becomes a little bit less room for the understanding. And I think while that *should* be fine, when you're in a university setting and have deadlines, things *have to* work and you have to make these measurable steps. And so that's why it becomes very stressful.” (David, PhD student)

Not only do the faculty’s requirements present themselves as a gatekeeping mechanism that determines what or who can be regarded as successful within the context of biomedical research. They also serve as a medium for communicating institutional ideas of what a “normal” process of doing a PhD should be like, by determining universal checkpoints that should be met within a specific time. While the use of clear checkpoints is celebrated abroad as a safety mechanism for securing students’ chances for successfully completing the education (Nature, 2024), PhD students oftentimes interpret faculty’s criteria as a message that failed experiments are neither acceptable nor normal, as other researchers have found before me (Gross, 2023, p. 405). Being aware of this, Susan worried:

> “The timeline gets, like, closer and closer, and I'm starting the second year thinking: “Am I already behind? I don't even have time to fail. This *needs* to work now”. So I think there's just no room for learning from your mistakes. You don't have the option of failure.” (Susan, PhD student)

The Faculty of Medicine and its component organizations seem to be aware of how prevalent perceptions of failure might negatively impact PhD students’ wellbeing and performance and have been trying to address this issue. For example, through interactive workshops on the topic of “Resilience & wellbeing in Academia” (Lund Stem Cell Center, n.d.) and “Connecting minds: Navigating Isolation and Building Belonging in Academic Life” (Lund Stem Cell Center, n.d.). The recent competitions in “Academic Oopsies: Embracing the unexpected” (Future faculty, 11.1.2024) likewise aimed to shift the negative narrative surrounding failure into something more uplifting and, most importantly, something that can be openly discussed. Here, Illouz is critical to making the individual responsible for providing validation for oneself as in this case a rejection of community’s responsibility to the student: “The modern obsession and injunction to ‘love oneself’ is an attempt to solve through autonomy the actual need for recognition, which can be bestowed only by an acknowledgement of one’s dependance on others” (Illouz, 2012, p. 151). As O’Shea (2023, p. 487-489) concludes, rather than adjusting to an inflexible institution, the system should, at least in part, be the one to change. Instead rendering individuals responsible for coping with excessive work and the risk of burnout, these should be understood as symptoms of a structural failure of the academic working environment which is not always compatible with certain lifestyles.

The current state of the biomedical PhD programme calls for additional measures to make failure safe not only in theory but also in practice, which would include supportive relations with the PI as well as more flexible criteria for defence that could take into consideration specific positions of each individual and their contribution to knowledge. Not doing so, as I demonstrate above, sends a message that failure is an unexpected deviation of the ideal way of doing research, which pushes it into the realm of morality and renders students individually responsible for what can be either a systemic issue or an unavoidable outcome of high-risk research.

6. Conclusion

This chapter represents the concluding part of the presented thesis, and is divided into three parts. Firstly, I summarize my main findings from the analysis, and proceed with discussing how institutions for higher education could use them to support and further develop a welcoming learning and working environment, as well as quality of scientific research. Lastly, I state the limitation of my small-scale research project, and offer suggestions for possible future research.

6.1. Summary

In this thesis, I explored the meanings attributed to failure by PhD students of preclinical medical research at Lund University. I conclude that these meanings are contingent on a) broader norms and beliefs of the scientific community, faced with the process of financialization, competition, assessments, and quantifiable deliverables; b) requirements for defence of the Faculty of Medicine that dictate the sense of success and normality; and c) internal norms and ideas that prevail within each research group and direct the research practices and attitudes of their members. I found that failure is commonly experienced as threatening, unexpected and unjust. Despite being common and in the long run unavoidable, it can be interpreted as an extraordinary obstacle to success, the latter often being equated to successfully completing the education in time and obtaining a PhD title. As such, it is reasoned with the moral frameworks of sensibility, in line with ascetic meritocracy. While the causes and forms of failure are numerous, the question why failure occurred matters far less than the question: “What now?”.

The dominant notion that high levels of engagement, hard work, discipline, and sacrifice hold the promise of success, contributes to working long hours, prioritizing work over one’s free time for rest and hobbies, struggling with physical and mental health, and neglecting relations with family, friends, and partners. A strong belief in the value of individual scientific achievement renders each PhD student personally and morally responsible for leading a project in a way that would provide them with required positive results. Thus, failure can appear as an indicator of a student’s lack of commitment, professional skill, interest, or passion, and can destabilize one’s confidence, sense of belonging, and position within the scientific community. A combination of commonly occurring failure and an unsupportive working environment provides grounds for feelings of social exclusion and maintenance of hierarchical structures within the lab, which is experienced as demoralizing. I conclude that an increasing prioritisation for work-life balance is increasing students’

dissatisfaction with the dominant work ethic, especially when students feel their work is not being appreciated. This mismatch in values hinders students’ passion and interest for pursuing an academic career, as well as recruitment of new PhD students.

PhD program is a rite of passage of becoming a scientist, through which PhD students acquire cultural fluency and internalize norms, ideas and beliefs of their scientific community. Performing according to the ideal of a good scientist is rewarded by being recognized as such. Rather than pointing to one’s professional abilities, this ideal often favours personal characteristics, such as being smart, curious, confident, and passionate about the research project. The scale of the PhD project, personal ownership of scientific achievements, expected level of engagement, as well as faculty requirements that highlight the individual contribution to science rather than their ability to collaborate, all further promote strong identification of students with their work. Thus, and because failure is oftentimes interpreted as morally charged, I found that sharing it with other members of the community makes PhD students vulnerable.

For PhD students, the sense of belonging to scientific community is additionally contingent on their passion for science, and their ability to express it represents a part of scientific identity. By desiring to orient themselves toward science and feeling excitement for scientific advancements or their own progress with project, PhD students continuously re-affirm to others as well as to themselves not only that they are good and where they are supposed to be, but that they’re going in the right direction. At the same time, this celebrated performance of passion for science can justify the ascetic focus on work and excessive sacrifice of personal life. I also described a conflicting perception of science as an object that promises happiness, with the ever-present and integral experience of failure as an object of misfortune. If the gap between the ideal of science and the negative perception of failure becomes too wide, it can leave students increasingly demotivated and susceptible to negative emotions triggered by failure.

Students sometimes struggle by themselves and restrain from asking for help because they think they would be regarded as “stupid” or “incapable”. In this respect, fear of failure further slows down research, isolates individual in their struggling and fosters their feelings of alienation to their professional community. I found that receiving recognition for one’s work, instead of (only) for successfully obtained results can minimize the negative consequences of failure and encourage professional independence. It takes consistent expressions of encouragement, understanding and

emotional support from both the PI and other lab members for a student to disassociate catastrophic narrative from failure. A positive, and in the context of science productive, understanding of failure presents the latter as safe, informative, and most of all undisputable and thus unrelated to the realms of ownership and morality.

6.2. Applicability

This thesis demonstrated not only how existing perceptions of failure impact the ways in which PhD students experience and manage their research projects, but also that these perceptions are learned and can change with appropriate education and support. To promote students’ wellbeing and performance, failure should not be considered as unexpected, value-less, or personal, and should be demystified of moral terminology. Also important is a strong safety net in a form of a social environment that can support the PhD students both technically and emotionally, by building a mutual sense of respect, trust, and recognition of one’s work, rather than one’s achievements. Opportunities for positive collaborations with other members of the scientific community that would give the students the sense of affirmation should be promoted, along with the sense that faculty cares for students’ wellbeing and prioritizes them as people over their achievements. At the same time, the association between the passionate scientist and excessive work hours should be actively discussed and problematized, particularly when it comes at the expense of students’ personal lives, as it oftentimes represents important part of safety net in times of professional crises.

6.3. Limitations and opportunities

The scope of this study did not allow me to sufficiently address the problem of structural inequalities that render some more vulnerable than others to social sanctions by instances of failure. Sarah Ahmed (2010) describes objects as “sticky” (p. 44), as their affective value gets stuck and accumulates around them (p. 44-45). Further research could explore the concept of “sticky failure”, that ties to some bodies more than to others. For example, much has been written how women in science have a harder time to be recognised and face greater instability of their position within the scientific community. Sometimes, women are forced to perform behaviour that is usually associated with masculinity and are less likely to be forgiven for their mistakes (Gruhlich, 2023, p. 73-75) and, I reckon, the failures that they face. Likewise, exploring how perceptions and experiences of failure in the context of preclinical research are correlated with ethnicity, race,

religious beliefs, and age should further illuminate the intersectionality of failure with social parameters.

My findings suggest that focusing on the interactions between time, PhD research, and failure would be especially important. Understanding cultural perceptions of time and ways of aligning oneself to the community by meeting career milestones in a defined amount of time would not only provide better understanding of the role that culture of assessment plays in experiencing PhD studies, but also help to identify ways in which they could be made more inclusive.

Lastly, many of the international informants compared Sweden with Southern Europe and United States and believed Swedish approach towards preclinical research is far less competitive. Comparing the ways failure is defined, experienced, and managed between among different Swedish Universities, among different countries, or different academic fields would consequentially be another research opportunity, that could potentially address the broader, but already recognised need of reforming the international criteria for attributing success and recognition to promote quality science and researcher wellbeing.

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