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BOTH A BLESSING AND A CURSE: A QUALITATIVE STUDY OF THE EXPERIENCES AND CHALLENGES OF AUTONOMY DURING THE DOCTORAL TRAJECTORY IN BELGIUM

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ABSTRACT

Aim/Purpose	This study investigates how PhD candidates experience autonomy (i.e., self-governance and the capacity to make meaningful, self-directed choices) in their doctoral trajectory. It examines their expectations regarding autonomy, the various forms of autonomy they encounter during their doctoral trajectory, and the dynamics that make autonomy challenging.
Background	PhD candidates, akin to the academic world at large, navigate a tension between exercising autonomy and conforming to standardization and regulatory frameworks. Within this context, this study explores how PhD candidates manage to balance autonomy and freedom and strive to meet the high and rigorous standards of obtaining a doctoral degree. The theoretical framework for this study consists of Berlin's (1969) Two concepts of liberty and self-determination theory.
Methodology	We use qualitative data from nine focus groups and three one-on-one interviews with PhD candidates (n=42). Data are analyzed using thematic content analysis.

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Contribution	Previous research highlighted the importance of autonomy in the doctoral trajectory and showed that autonomy can have different dimensions and characteristics. However, research on PhD candidates' expectations regarding autonomy and how autonomy manifests itself in their trajectory is lacking, considering different dimensions of autonomy. This study contributes by exploring the expectations and experiences of autonomy among PhD candidates and variations herein across disciplines (i.e., life sciences and medicine, natural sciences and bioscience, engineering, and human sciences) and types of appointments (i.e., teaching assistants, personal mandate, or project funding). Literature also shows that autonomy in the work environment is not, by default, beneficial. A second contribution of this study is the identification of challenges and potential pitfalls associated with autonomy in the doctoral context.
Findings	First, PhD candidates deem autonomy essential for their research, as it requires creating new knowledge, being able to adapt to unforeseen events, and learning how to become an independent scholar. PhD candidates mainly expect autonomy in their control over time, freedom to develop themselves, and a sense of ownership over the project. However, their experiences predominantly reflect operational autonomy (i.e., autonomy regarding the conduct and organization of research) rather than strategic autonomy (i.e., autonomy regarding the research agenda and content). Second, there are explicit challenges and pitfalls associated with autonomy. PhD candidates mainly encounter "negative freedom," and often experience autonomy as chaos, citing a lack of clear expectations, lack of control, lack of interaction, and lack of supervisory support as significant pitfalls. Two key dynamics contributing to these issues are the specific supervisor-supervisee relationship and conflicting role perceptions. Additionally, the study identified systematic differences in these matters across and within disciplines. These insights provide a nuanced understanding of the autonomy experienced by PhD candidates and highlight the need for institutions to rethink how they support PhD candidates in managing autonomy.
Recommendations for Practitioners	These findings indicate that institutions and supervisors should cultivate an environment wherein autonomy is experienced as positive freedom. Achieving this involves balancing academic freedom with accountability measures (such as training supervisors and co-supervisorship and providing regular feedback) to enhance the quality of supervision. Supervisors, in turn, can promote autonomy for PhD candidates by facilitating regular interactions, providing constructive feedback, and ensuring expertise alignment.
Impact on Society	The "publish or perish" culture, characterized by standardization and decision-making based on fixed performance measures, diminishes strategic autonomy for PhD candidates. Excessive operational autonomy can be perceived as chaos, challenging equitable opportunities and outcomes among PhD candidates. Furthermore, it exacerbates feelings of self-doubt and contributes to the development of imposter syndrome.
Future Research	Future research should explore how autonomy emerges from the dialogue between supervisors and PhD candidates. It should also investigate the support mechanisms supervisors require to be supportive of autonomy and examine how supervisors tailor their autonomy support to accommodate the heterogeneous group of PhD candidates. Furthermore, future research could

focus on identifying and elaborating on additional dynamics that complicate dealing with autonomy within the doctoral context.

Keywords PhD candidates, autonomy, freedom, supervisor, role perception, self-determination theory

INTRODUCTION

A PhD trajectory – the process of obtaining a doctorate – is a highly flexible and dynamic process. It is often characterized by individual support and diverging support styles, as well as high expectations of the PhD candidate to be able to conduct research independently (Haas, 2017). Writing a dissertation requires creating new knowledge and exploring new paths. This underlines the importance of autonomy and freedom in the process. At the same time, the expected output at the end of the trajectory is very standardized and presumed to be of high quality. Global competition in knowledge-based economies has urged shifts in doctoral training. Between 2014 and 2023, the number of doctoral holders in the European Union has increased by 50% (from 0.8% to 1.2% of the population) (OECD, 2024). In Flanders, the context where this study takes place, the number of obtained PhDs has quadrupled in the last 30 years (Expertisecentrum Onderzoek en Ontwikkelingsmonitoring [ECOOM], 2023). As the number of PhD candidates is growing, universities are increasingly motivated to pursue high completion rates (Ruano-Borbalan, 2022). As a strategy to increase the efficiency of doctoral programs and reduce dropout rates, fixed and quantifiable standards increasingly became the norm in doctoral education (Kehm, 2020). This trend is turning the dissertation into an increasingly standardized form of knowledge production and transfer, calling into question the autonomy that is highly valued in academia. These pressures necessitate a deeper understanding of how autonomy takes shape in doctoral education.

The years-long doctoral process, characterized by flexible time management, concludes in a single manuscript that determines candidates' acceptance into academia. PhD candidates thus function in a field characterized by high levels of autonomy and freedom as well as strict regulations regarding their performance and the knowledge they produce (e.g., the expected number of publications, publications in high-ranked journals, the expected number of credits earned, etc.) (Kehm, 2020). In this way, PhD candidates are caught between freedom and restrictions (Haas, 2017). These competing pressures necessitate a deeper understanding of how autonomy takes shape in doctoral education. In this context, we aim to assess how PhD candidates navigate that balance between being autonomous and trying to live up to the high and rigorous standards of doing a PhD.

Having to compete and live up to these expectations while being expected to work independently can foster insecurities among PhD candidates (Cisco, 2020). Based on data from 3,407 PhD candidates, Keloharju et al. (2024) found that the prevalence of depression and anxiety among PhD candidates is 10% to 20% higher compared to master's graduates who are not pursuing a PhD. Using longitudinal data and a difference-in-difference method, they investigated whether this was due to an increased likelihood of students with pre-existing mental health issues enrolling in doctoral education or whether these issues developed during their PhD studies. The latter appeared to be true. Moreover, they found that mental health issues intensified during the later stages of the doctoral trajectory. Research on the lived experiences of PhD candidates is thus important, as it can provide insight into what dynamics contribute to these challenges.

In the literature overview, we argue (1) that autonomy can have different dimensions and characteristics (Berlin, 1969; Woelert et al., 2021) and explain (2) why autonomy is an important asset within the academic environment. Previous research already focused on the importance of autonomy for PhD candidates (e.g., Kusurkar et al., 2022; Orellana et al., 2016; Wang & Shibayama, 2022) but lacked insight into the perception of autonomy and its different dimensions. Our *first aim* is, therefore, to find out what doctoral candidates expect from autonomy and how different dimensions of autonomy

manifest themselves during the PhD trajectory. The literature also shows that autonomy is not, by default, beneficial. Therefore, our *second aim* is to investigate the pitfalls of autonomy in the context of PhD trajectories. Previous research showed that PhD candidates often confuse structure with control (i.e., lack of autonomy support) (C. Devos et al., 2015). We assess whether this confusion also exists between autonomy and chaos (i.e., a lack of structure). Furthermore, if we find such confusion, we aim to identify concrete examples within the PhD trajectory where this confusion is cultivated or maintained. As such, our main research question is, "How do doctoral candidates experience autonomy in their PhD trajectory?" We further divide this question into three sub-questions:

RQ1: What do doctoral candidates expect from autonomy in the PhD trajectory?

RQ2: What form of autonomy do doctoral candidates find in the PhD trajectory, and is there confusion with chaos?

RQ3: What are the specific outcomes of confusing chaos with autonomy and what dynamics lie behind this?

We answer these questions using data from focus groups and one-on-one interviews with 42 PhD candidates. When discussing the results, we pay special attention to differences between disciplines (i.e., life sciences and medicine, natural sciences and bioscience, engineering and human sciences) and types of appointments (i.e., teaching assistants, personal mandate, or project funding). Teaching assistants are hired and paid by the university, and their research is combined with teaching duties. They are required to spend 40% of their work time on teaching and 60% on research and have six years to complete their PhD. Those with a personal mandate receive funding that is specifically assigned to them. Project funding means that the funding was assigned to the supervisor, who then hired the PhD candidate to execute the research project. These two groups should complete their PhD in four years and are, in theory, required to spend 10% of their work time on teaching duties. The study's overarching goal is to get a clearer picture of what conditions autonomy must meet for PhD candidates to experience its benefits. This should allow highlighting the complexities of autonomy for PhD candidates and its implications for their mental health and academic performance.

LITERATURE OVERVIEW

THEORETICAL FRAMEWORK ON AUTONOMY

From a human resources perspective, autonomy at work refers to a level of freedom on different dimensions of a job: the work schedule and work procedure (Burchardt et al., 2010; Langfred & Moye, 2004; Saragih, 2011), the decision-making about the execution of tasks (Lin et al., 2013), the performance of tasks (Özkoç, 2016), and the opportunity to pursue goals based on personal values (Wu et al., 2015).

Berlin's (1969) *Two concepts of liberty* shows that autonomy is not a straightforward concept but can manifest in different forms. Berlin distinguished two kinds of freedom: positive and negative freedom. "Negative freedom" refers to *being free from* external constraints or interference of others, especially from authoritative powers. In this view, being free refers to non-interference in one's actions, choices, or decisions. Individual autonomy is key, and the role of any authority is minimal and restricted to prevent harm to others. This negative freedom is a necessity for spontaneity, originality, and genius. "Positive freedom" refers to *being free to* act in a way that controls one's life. Self-mastery and realizing one's potential are key elements of this. Positive freedom differs from negative freedom as it does not focus on being free from external constraints but on controlling one's desires, goals, and actions. This might require external assistance or intervention (e.g., education, institutional structures, etc.). Interestingly, both forms of freedom also come with their challenges. Negative freedom, the absence of interference, neglects that some people are more equipped than others to exercise their freedom and may result in unequal opportunities. Positive freedom, where external intervention

is justified, may involve authorities claiming to know better what individuals need than they do. This may lead to coercion in the name of freedom.

Work autonomy also occupies a central place in Self-Determination Theory, and more specifically in the component of Basic Need Theory (Ryan & Deci, 2000). This theory argues that the effect of an employee's workplace context and individual characteristics on their work experience and motivation is mediated by a set of basic psychological needs. These are the need for autonomy, competence, and relatedness. Satisfying these needs stimulates autonomous motivation, well-being, and improved work performance. The authors argue that when the need for autonomy is satisfied within employees, usually the two other needs are also met, justifying the emphasis on the need for autonomy (Deci et al., 2017). According to the Self-Determination Theory, autonomy can be understood as having a sense of ownership over the job, understanding the worth and purpose of the job, and acting with a sense of volition (Ryan & Deci, 2000). The workplace context plays an important role in satisfying the need for autonomy, as it can either support or reduce autonomy within employees. Supervisors, in particular, are highly influential in facilitating employees' autonomy (Kanat-Maymon & Reizer, 2017). Acknowledging the worker's perspective (including perspectives of negative affect), offering choice, explaining the reasons behind requests (when choice is not an option), encouraging initiative, and minimizing pressure and controlling language are practices that characterize supervisors' autonomy support. Especially for complex tasks that require creativity and information processing, such as research, autonomy support is highly effective for positive work outcomes and more effective performance (Kanat-Maymon & Reizer, 2017). The opposite of autonomy support is control or coercion (Stroet et al., 2013).

Satisfying the need for autonomy relates to stronger autonomous motivation, meaning that employees engage in an activity based on willingness, volition, and choice (Deci et al., 2017). It also encourages employees to engage in proactive behaviors, such as problem-solving, building networks and relationships, seeking feedback, voicing concerns, and (re)shaping their tasks to increase meaning and engagement (Grant & Ashford, 2008; Strauss & Parker, 2014). In sum, both Berlin's (1969) approach to freedom and Self-Determination Theory show that supporting autonomy can be very beneficial for new researchers.

Note that freedom and autonomy are often used interchangeably in everyday conversation because both involve ideas of self-determination and the absence of external control. While *freedom* is more about the absence of external barriers, *autonomy* is about self-governance and the capacity to make meaningful, self-directed choices. One can, however, be autonomous without being completely free (i.e., without being restricted by others). Indeed, self-governance should always follow certain laws of logic and rationality and some guiding principles (Gregor, 1997).

Autonomy in Academia

A discussion about autonomy for PhD candidates should start with a general discussion about the environment in which they operate. Autonomy in academia has been the object of intense debate (Carvalho & Diogo, 2018; Niemczyk & Rónay, 2023). Within this environment, different types of autonomy can be distinguished. *Institutional autonomy* means that universities are free to administer and govern themselves, both academically and financially, independently from state or other external control (Etomaru et al., 2016). Various declarations on institutional autonomy (e.g., Magna Charta of European Universities, Lima Declaration, Kampala Declaration, etc.) advocate for the worldwide interest in protecting universities' policies from political demands and other external forces. Shifting away from state control, market-like competition between and within universities becomes increasingly common (Enders et al., 2013). Research performance has increasingly become the dominant measure of excellence and the basis for the division of resources (Niemczyk & Rónay, 2023). This pushes universities towards functioning as corporate enterprises, focusing on quantifiable research output. In turn, this impacts the quality of the research and instills a form of bureaucratism and control (Enders et al., 2013; Shore & Wright, 2004). Universities move between being autonomous, critical entities

that generate independent knowledge and, at the same time, a sense of accountability, high expectations, and strict regulations. This dynamic puts pressure on the entire academic context and trickles down from the institutional level to the level of individual researchers.

Academic autonomy refers to the autonomy of the members of the academic profession. This entails the "right and freedom to decide on investigation topic, research objectives, research methods, and research executions without external influences" (Niemczyk & Rónay, 2023, p. 331). However, universities are faced with increasing managerial control over the decision-making process regarding the careers of academics (i.e., recruitment, salaries, promotions, duties, etc.) (Niemczyk & Rónay, 2023). In line with what was described above, this decision-making process is mainly based on quantifiable output. Researchers are evaluated based on the number of grants they acquired, articles they published, and students they supervised rather than on the quality of their work. This dynamic cuts back on researchers' academic autonomy as they increasingly must adhere to rigorous standards. Although much has been written about the recent changes in institutional autonomy, less attention has been devoted to how this has impacted academics at the individual level. For this reason, Woelert et al. (2021) emphasize the concept of *practical autonomy*, referring to how much academic autonomy researchers can effectively apply in their research practice. Practical autonomy consists of two different dimensions: the autonomy to decide over the content of the research and research agenda (i.e., strategic autonomy) and the autonomy over the actual conduct of their research (i.e., operational autonomy) (Bailyn, 1985). Note that these two do not necessarily correlate. Researchers may feel that they have a lot of freedom to determine their research topic but have no autonomy over the resources needed to conduct that research – and vice versa. Researchers in different disciplines appear to need different types of autonomy. Those in the sciences mentioned funding (strategic autonomy) as the most important, while those in the humanities and social sciences indicated that autonomy in terms of time (operational autonomy) was the most important aspect (Woelert et al., 2021).

This study focuses on PhD candidates, as autonomy is a particularly crucial element in a doctoral trajectory. The essence of the dissertation is to contribute new and original knowledge (Ruano-Borbalan, 2022). This implies that, although they are supported in their trajectory, they are the first to explore a certain area in their field. Several studies already highlighted the important role of autonomy and its relationship with other aspects of the PhD trajectory (e.g., Kusurkar et al., 2022; Orellana et al., 2016; Wang & Shibayama, 2022), yet a deep understanding of (1) *what* exactly PhD candidates expect from autonomy and (2) *how* they experience it, as well as (3) how this *varies* between PhD candidates depending on statute and discipline, have not yet been accounted for.

Application to the PhD Context

Supervisors consider the ability to work autonomously as a prerequisite for a good PhD candidate (Torka, 2018). In line with this, Barnard and Shultz (2020) examined what the autonomy of PhD candidates meant to supervisors. They found that supervisors expect their supervisees to be able to investigate matters independently so that they can develop into independent researchers, to have an autonomous, intrinsic motivation to carry out the project without being dependent on the supervisor's encouragement, and to have autonomy to come up with their own ideas. Furthermore, they discussed elements that supervisors perceived as impeding autonomy, such as technical constraints, dependence on funding, lack of experience, and the academic pressure to publish. Since their study is limited to supervisors in chemistry, the authors suggested expanding the research to other disciplines and considering the point of view of the PhD candidates. This is one of the aims of this study.

Although supervisors should be autonomy-supportive, A. Devos (2004) argues that good mentorship is not about giving a lot of autonomy but rather about offering a balance between autonomy and regulations. A. Devos (2004) suggests that mentees desire to move back and forth between being actively in charge and being taken by the hand and guided by a mentor. This may be particularly relevant for PhD candidates, whose task is to produce new knowledge but who have little experience in doing so themselves. PhD candidates are required to explore uncharted territory, which can be both

exciting and frightening. Supervisors should simultaneously encourage PhD candidates to develop their skills and conduct research independently while familiarizing and enabling them to participate in the academic and disciplinary culture (Manathunga, 2007). Recent research showed that PhD candidates whose supervisor administered the right balance between support and autonomy had higher rates of motivation and satisfaction (Al Makhamreh & Stockley, 2020). Three suggested methods to do this are: (1) supervisors can align their own work expectations and those of their supervisees early in the trajectory; (2) set specific, achievable goals to work toward; and (3) focus on encouraging independence and collaborative skills in the PhD candidates they supervise (Cardilini et al., 2022). This corresponds to Berlin's (1969) notion of positive freedom.

Indeed, several studies have already shown that too much unstructured autonomy can have negative effects, such as excessive pressure and workload (Yang et al., 2024), unethical behavior (Lu et al., 2017), and role ambiguity (Beenen et al., 2017). Baltes et al. (2002) found a U-shaped relationship between autonomy and job satisfaction. There are indications that autonomy does not always function as a mediator for proactive behavior in an autonomy-supportive work context. Beenen et al. (2017) found that in a work context where autonomy was supported, employees were not more likely to seek feedback as they felt that the high amount of trust on the employees' end made asking for feedback abundant. Wang and Shibayama (2022) also found that the positive effects of autonomy are sometimes counteracted by the negative effects of insufficient guidance and suggested that further research should focus on the conditions under which autonomy fully exhibits its positive outcomes.

The latter could also be derived from Self Determination Theory, which not only requires autonomy support for need satisfaction but also requires sufficient structure (Stroet et al., 2013). In this context, 'structure' should be understood as the available information on the expectations and the ways of doing things to achieve desired goals, which are given to students by their teachers (Jang et al., 2010). Note that autonomy and structure are not opposites but ideally accompany each other. This is also relevant for PhD candidates. C. Devos et al. (2015) found that in PhD supervision, there is a thin line between structure and control (i.e., the opposite of autonomy support). The structure provided by the supervisor is often perceived as controlling. This raises the question of whether the opposite could also be true, namely that a lack of structure (i.e., chaos) tends to be (falsely) considered as "autonomy" in the context of PhD trajectories. Chaos is characterized by a lack of communication on expectations and directions, contradictions, and expected outcomes without clear guidance on how to attain them (Jang et al., 2010) and, in that sense, resembles Berlin's (1969) notion of negative freedom.

METHOD

CONTEXT AND SAMPLE

To answer our research questions, we used data from focus group interviews and one-on-one interviews with PhD candidates enrolled at Vrije Universiteit Brussel in Brussels, Belgium. A qualitative research method was used to gain insight into the "lived experiences" of PhD candidates and to understand their experiences with autonomy through concrete stories and examples (Lareau, 2021). An additional asset of using focus groups was that it allowed us to observe the interaction between participants and identify consensus (or disagreement) regarding certain aspects (Morgan & Kreuger, 1993). This data collection was part of the PhD survey project. The latter is an annual survey at Vrije Universiteit Brussel to monitor the experiences and satisfaction of PhD candidates and provide more insight into the dynamics behind the doctoral process. In 2024, a qualitative part was added to the project to provide more context and nuance to elements that emerged as important from the annual survey.

In the Belgian context, PhD candidates have four years to complete their doctorate (six years for teaching assistants). Most PhD candidates receive a salary, except those who self-finance their research (Eurydice, 2023). PhD candidates sign an employment contract with the university, and their

appointment is, by default, full-time. Most of them also take up other duties next to their doctoral research, such as teaching duties, assisting in other projects, cooperating with the industry or other sectors, and so forth.

In Belgium, PhD candidates are enrolled in a doctoral school depending on the faculty to which they belong. The doctoral schools overarch faculties with a common scientific discipline and generate a common culture and policy within them. In this study, we distinguish between the discipline or doctoral school of Life Science and Medicine (Medicine & Pharmacy, and Physical Education & Physiotherapy), the doctoral school of Natural Science (Bioscience) and Engineering (Sciences & Bio-science Engineering, and Engineering Sciences), and the doctoral school of Human Sciences (Arts & Philosophy, Economics & Social Sciences, Law & Criminology, and Psychology & Educational Sciences).

We composed our sample in a way that took into account the heterogeneity within the population of PhD candidates (i.e., focusing on diversification between genders, disciplines, types of appointment, and seniority). Therefore, we used a stratified sampling method (Robinson, 2014). In total, nine focus group interviews and three one-on-one interviews were conducted, generating data from 42 individual respondents (see Table A1 in the Appendix). Eight belonged to the Doctoral School of Life Sciences and Medicine, 13 to the Doctoral School of Natural Sciences and (Bioscience) Engineering, and 21 to the Doctoral School of Human Sciences. There were 24 female and 18 male PhD candidates in our sample. Eighteen of them were teaching assistants, and 24 were funded by either project funding or a personal mandate. One of those had been self-financed before receiving funding. We kept conducting interviews until a point of saturation; that is, the point where we recognized patterns, and the addition of new data offered little new insights.

Procedure

All PhD candidates enrolled at VUB were emailed a tailored newsletter with an invitation to participate in this study. Those who were interested were asked to complete a short questionnaire to provide further background information (e.g., date of enrollment, faculty, type of funding, etc.) and their contact details. A second email was sent specifically to those in the doctoral school of Life Sciences and Medicine because few of them initially registered. In total, 90 PhD candidates responded to the call. Respondents who were enrolled as PhD candidates for less than six months were excluded due to their limited experience with the doctoral trajectory (n=20). All remaining PhD candidates were contacted by email to schedule a focus group interview or one-on-one interview. The one-on-one interviews were organized for practical reasons, for respondents who were unable to make it to the focus group to which they were initially invited. The same topic list was used during the focus groups, and the interviews, and the profiles of the respondents were similar. Therefore, the findings of both methods were complementary and showed no significant differences. Forty-two respondents were eventually included in the data collection. Those who were not included either did not schedule an interview or did not show up.

The interviews took place at the university between March and May 2024. The focus groups consisted of three to six participants and lasted, on average, two hours. The one-on-one interviews took an average of one hour. All respondents were provided an informed consent form with information on how their data would be handled, their rights as participants, and how to exercise these rights one week before the interview took place. All respondents signed this form before the start of the interview. Anonymity was guaranteed at all times. No names were included in the transcriptions of the interviews or during further steps of the research. The recordings and interview transcripts are only accessible to the researchers involved in the study. We prepared a list of questions from several topics to guide the conversation, but there was flexibility to ask other questions and delve deeper into interesting insights participants came up with. Slight adaptations were made in the questions throughout the data collection phase based on previous conversations. The general topics and list of questions are included in Table A2 of the Appendix.

The themes for the topic list were determined based on previous findings during the PhD survey project. Three overarching themes were defined: experiences with (supervisor) support, task load, and competition and collaboration.

Data Analysis

To identify patterns and construct meaningful themes, we used thematic content analysis as described by Braun and Clarke (2006). First, we familiarized ourselves with the data by listening to the recordings, transcribing them, and reading the transcripts. All three researchers read the transcripts separately. They then identified interesting features across the dataset, generating initial codes (e.g., "respondent can choose when to start and end their workday," "freedom and time are the most important elements for success," "when starting their PhD, respondents did not know how much independence they needed to demonstrate"). The wording was rather specific, staying as close as possible to what the respondent actually said. Furthermore, these codes were grouped into broader categories, identifying themes (e.g., "the importance of autonomy for research," "positive aspects of autonomy," "negative aspects of autonomy"). Once a series of initial themes was identified, all three researchers discussed these interactively. We reviewed the themes and their fit to the entire dataset – to refine and eliminate some themes. Finally, we wrote an analysis for each theme separately and combined them to compose a narrative to answer our research questions. For the analysis, we followed an inductive approach. The ideas and themes were identified without a preconceived idea or direction.

Positionality of the Researcher and Trustworthiness of the Data

In qualitative research, the positionality of the researcher plays a crucial role in shaping the research process by influencing data collection, interpretation, and overall findings. While positionality can offer advantages, it also brings challenges that need to be carefully navigated to maintain research integrity and objectivity (Lareau, 2021). One advantage of the fact that the researcher conducting the interviews was a PhD candidate herself was that the power imbalance between the researcher and the respondents was minimal. The respondents and the researcher had equal knowledge about the topics and shared experiences. This high level of understanding presumably made it easier for the respondents to express themselves in a comfortable way. However, one of the challenges related to this was the risk of insider bias. The researcher's own experiences may have unconsciously led to assumptions about participants' perspectives. To mitigate this, the topic list was discussed beforehand with a steering committee and other stakeholders to ensure it contained all relevant elements. Furthermore, a structured approach was used for the data coding, and the analysis of the data was done in consultation with the two postdoctoral researchers to avoid fixation on individual experiences, as described above. Finally, the qualitative data were collected as a complement to a survey that had been conducted annually since 2017 among the PhD candidates at the university. As such, we were able to triangulate data and confirm that the qualitative findings corresponded to quantitative findings, enhancing the credibility of the data.

Findings

In this section, we discuss the findings of the study. First, we explore why the respondents considered autonomy an essential part of doing doctoral research. Then, we discuss what forms of autonomy PhD candidates are expected to receive. In the following section, we investigate the challenges and pitfalls they experience regarding autonomy, and finally, we analyze what dynamics in the doctoral process contribute to these issues.

Autonomy as a Necessity for Doing a PhD

The first research question examines what PhD candidates expect from autonomy during their PhD trajectory. Freedom and autonomy were themes that were brought up early in the interviews by the

respondents, often even without directly asking about them. More specifically, autonomy and freedom appeared to be a fundamental part of a PhD trajectory for three reasons: it is a *creative*, *dynamic,* and *challenging* process.

Creative process

Several respondents considered doing a PhD as a *creative* profession. They highlighted the creative process behind writing, composing surveys or interview questions, and analyzing and interpreting data. Doing research and developing new knowledge takes time, and getting the freedom to dive deep into certain aspects of the research, stare into the void, and weigh interesting angles were deemed essential. Doing a PhD was perceived as a creative process that takes time to develop. This was reflected in the following quote, where a respondent compared doing research with painting.

> I try to see myself as a painter, a painter standing in front of a painting … You can't always work on that … that's how I try to … that helps me, that does help me. Because sometimes, indeed, it's just one of those afternoons where you can't get anything in your head … (P1, Human Sciences)

Dynamic process

Respondents acknowledged that doing research is not always linear but rather a dynamic, iterative process where ideas and plans are modified along the way. They considered it important to remain flexible and be able to independently adapt to these changes. Although this was true for all PhD candidates, adapting to unpredicted circumstances was a theme that was the most prominent among teaching assistants. Their teaching duties vary from year to year (or semester to semester). They are often faced with problems that they must solve themselves. Therefore, for this group, autonomy might even be a more fundamental aspect of the job.

> My plan was not originally written by me, but by my supervisor. You try to work towards it, but it is not always feasible. (…) which is not bad in itself, because you have to be flexible, and research is something dynamic. (P2, Life Sciences and Medicine)

Challenging process

Many consider doing a PhD is not a normal job but a unique position. Although the majority felt like employees and no longer identified as students, they had a strong feeling of still being under development. They acknowledged that doing a PhD is a learning process and that they were becoming a researcher but that they were not quite there yet. This process was both perceived as challenging and inherent to doing a PhD. Indeed, taking on the challenge of becoming a researcher and demonstrating oneself as an independent academic who can figure things out by themselves was seen as an intrinsic part of the PhD process. As the following quote describes, the challenge of figuring things out independently is perceived as important.

> It's challenging because that is what it should be. If it is easy, then it cannot be a PhD project. (…) I was talking to another PhD student, and he said that the PhD itself isn't challenging anymore. He told me that he was doing well, but now he thinks it's not challenging, because now he knows what to do, and he's trying to finish the PhD as quickly as possible, so he's no longer interested in the PhD topic. (P3, Natural Sciences and Engineering)

Creating new knowledge, being able to adapt to unforeseen events, and learning how to become an independent scholar are presented as inherent parts of doing a PhD. The respondents pointed out that these elements require a level of freedom and autonomy. As such, freedom and autonomy were perceived as a functional necessity of doing a PhD and not a luxury or a favor. In the following section, we elaborate further on how PhD candidates understand freedom and autonomy and how they evaluate it.

EXPECTATIONS OF PHD CANDIDATES REGARDING AUTONOMY

Respondents were aware that autonomy and freedom in doing a PhD was a double-edged sword: they preferred and anticipated it, but at the same time, felt that it was expected of them. At the start, autonomy and freedom were evaluated as something very positive. When asked about the best part of doing a PhD, recurring answers were: "the flexibility," "the independence," and "the freedom." As mentioned in the literature overview, freedom, and autonomy are often used interchangeably in everyday speech. Although the respondents hardly used the term "autonomy," when using the aforementioned terms, they seemed to be talking about "autonomy" (i.e. self-legislation) rather than absolute freedom.

In this section, we discuss findings related to the first part of the second research question: "What form of autonomy do doctoral candidates find in the PhD trajectory?" Respondents usually started by describing the positive elements related to freedom in their job: control over their time, freedom to develop, and a sense of ownership.

Control over time

Respondents liked that they could decide when to do what and decide for themselves what tasks to prioritize. They could control their schedule, and their supervisors also supported this. Many said, for example, that their supervisors allowed them to work outside regular working hours as long as they got their work done.

> The flexibility, for me, is the best thing ever … I have a lot of hobbies so spending my day around them is quite nice, so I can work at night … for me, that works well, so … I couldn't do that in a corporate job." (P4, Human Sciences)

Freedom to develop

Respondents appreciated that they could choose for themselves which courses they took in the doctoral program, thereby selecting courses and workshops within their field of interest. Moreover, many valued the freedom to take courses out of personal interest that were not necessarily directly linked to their research topic. One respondent even mentioned that they could cherry-pick extra tasks outside their research, enabling them to experience and evaluate different aspects of academic life as a possible future career, as illustrated in the following quote.

> I do tasks because I want to do them, also a bit to see: do I want to stay in academia? So, I did some teaching, and I also supervise master thesis students. I am also working on two other papers from master students … but just because I want to, not because it is expected. My supervisor is really just like: go ahead. (…) but if I didn't want to teach, I wouldn't have to. (P5, Human Sciences)

Sense of ownership

Although not explicitly formulated this way, respondents valued being able to do their own thing. Being given the freedom – and the time – to come up with new research questions and look around until they find something interesting was important, as described in the following quote.

> You're just looking around in the void. You can think, 'Ah this seems interesting'. And then you go and investigate that. So … you don't have that in the industry, I think. Then you just have to solve concrete problems that exist, and then you don't have your own problem that you can formulate. (P6, Natural Sciences and Engineering)

However, there appeared to be a tipping point here where structures were less supportive of autonomy and became more coercive. Although shaping their research project was highly valued, not that many respondents actually experienced this. Several respondents mentioned that the output of their project was predefined, without much freedom to shape it themselves. This was mainly related to the

type of funding they received. Whereas teaching assistants experienced a high level of freedom in defining their project (as they could define their research project without being financially dependent on it), those with project funding tended to be tied to stricter regulations.

> [My project] is kind of a specific project where the outlines were already very clear, so … in the end, the problem is almost that I [have to] really put myself inside of that box and not define my topic after what I'm finding during the time, as much (…). There is some… freedom, but also it has to go towards building a sort of tool … like, there is definitely … the funding is for something that is not useless in the end (…) in the end you definitely need to see that your topic matches with that call …" (P7, Natural Sciences and Engineering)
>
> (…) and that is a bit, I think, a bit of the curse of a PhD. The thing of: 'Oh, you have all the freedom you want and do your thing.' But the deliverables have to be there." (P8, Human Sciences)

The two quotes above show that respondents sometimes felt restricted by the expectations that came with the project. In this matter, the relationship with the supervisor played an important part in their sense of autonomy. Respondents appreciated it when someone gave them directions without immediately telling them what to do and how to do it. The majority indicated indeed that the supervisor did not give them strict instructions. A supervisor who nudged their mentee in the right direction rather than enforcing certain ideas was highly valued. This is illustrated in the following quote.

> [My supervisor] asked about [a] paper, and I said, 'I was doing this, so this is why I didn't have time for the paper', and then he said, 'That's okay, but if you can [make] more time for the paper, it would be nice, because it's a nice paper, so let's publish very soon', and … that was a nice strategy, I really liked it, because he didn't push me to work on it as soon as possible (…) Sometimes I need help. Sometimes someone needs to remind me that I need to do this task. But that person should not be that strict, at the same time, so let's say, it's in between. (P3, Natural Sciences and Engineering)

In sum, respondents regarded freedom and autonomy as the freedom to organize their time and the freedom to develop themselves, which they found in their job. Additionally, they mentioned the freedom to consider interesting perspectives on their research project, to dive deep into the research, and to shape the project as important. However, the main emphasis for respondents was on freedom in terms of *time* (e.g., taking their time, being flexible in when to work, and dividing their own time over different tasks). In terms of autonomy to shape their project and to be creative, there was a clear distinction between respondents whose research proposal was already defined when they started their PhD and those who still had to define their research angle in the starting years of their PhD. The latter group more often emphasized this type of autonomy, while the former group more often felt like they were just executing the project and that the aspect of creativity was often missing. Moreover, in the life sciences and medicine, there were no mentions of this strategic autonomy.

The Downside of Autonomy

In this section, we discuss how autonomy and chaos are sometimes confused. This relates to the second part of the second research question. Although the interviews usually began with praising the benefits of having a lot of freedom and autonomy, as conversations progressed, it became increasingly clear that this autonomy and freedom also had a downside.

> P9: So, yeah, flexibility and freedom are something that I, if I have to give a positive point to people who ask, if I want to sound optimistic, that's what I say.
>
> Interviewer: And if you want to sound negative, what would you say?
>
> P9: Uh… Yeah, the vagueness of it all." (Human Sciences)

The quote above shows that there is a fine line between the freedom to do your own thing and the *vagueness* that comes with it. Many mentioned that they started a PhD trajectory blindly and often feel that they do not really know what they are doing. This feeling remained present during all stages of the trajectory. Several mentioned that "*the freedom comes with a cost*."

> P5: (…) it is like: you throw me in the pool and either [I] swim or … yeah …
>
> P8: Drown …" (Human Sciences)

The quote above illustrates that autonomy can make PhD candidates feel lost. In what follows, we discuss four main difficulties respondents experience regarding autonomy in the PhD trajectory.

Lack of expectations

Respondents often did not have a clear idea of what was expected from them. They mentioned that the requirements to obtain a PhD felt rather ad hoc and vague. A teaching assistant said: "*We just need to publish, and that is the only guideline we get*." The respondents indicated that there is a lack of clear expectations and guidelines regarding the role of PhD candidates. Those whose supervisors formally set clear expectations from the outset rated this as very positive and reassuring.

Lack of control

As interviews progressed, the highly valued freedom and flexibility regarding when and where to work showed several downsides. For some, having to report to their own project without someone holding them accountable for being in the office by a certain time left them feeling that no one really cared whether they were there – making it sometimes difficult to motivate themselves. For others, the great flexibility in working hours meant they did not always know when to stop. A teaching assistant said: "*I love the flexibility, but it can also be dangerous. (…) You're over your limit before you know it, and then you crash."*

Additionally, many respondents mentioned that the great flexibility in working hours resulted in receiving emails and messages outside of work hours, which created pressure to respond to these messages and always be available. However, the latter did not hold for everyone. When it was explicitly stated that messages should not be responded to outside of working hours, most had no problem with receiving such messages. They even said that they found it convenient to be able to send emails outside of working hours themselves.

Lack of interaction

Related to the previous element, several respondents mentioned that the flexibility in working from home resulted in less close contact with colleagues. Since many respondents had no rules about when to come to the office and when to work from home, they felt like they could not count on colleagues to be there when they needed help with something. This made it especially hard for newcomers to integrate into the group. In addition, loneliness was also often mentioned as a side-effect of autonomy. PhD candidates generally tended to be working on a project that had little or nothing to do with that of their colleagues. Therefore, they often felt like they had no one to talk to or ask questions about the specifics of their project except their supervisor. Many mentioned "*being on their own island"* or *"only having themselves."*

The lack of interaction appeared less prevalent in the life sciences and medicine. In this field, working from home was less common, and collaboration with others was more common. Respondents also stated that they felt less lonely because they did not only do their research from behind a computer but also regularly worked in laboratories or the hospital and had contact with others. They also mentioned more often that colleagues help each other.

Lack of supervisor support

The supervisor plays an important role in the autonomy that PhD candidates experience. However, the interviews showed that there is a thin line between giving freedom within a given structure and

complete freedom without a predetermined direction. In the latter case, respondents feel lost, and their freedom turns into chaos and helplessness.

> Maybe I'm too pessimistic. But when I hear my friends like: 'Oh yeah, my supervisor works in the lab with us and teaches us what we need to do'… not like, spoon-feeding or whatever, but it's more like making a scaffold, like 'This is the structure, and now it's up to you how you will perform it, and then we have discussions about it.' But with me, it's like: 'Yeah, go ahead. Research anything you want'. And I'm like: 'Oh my god… Where is the structure?' There is supposed to be a middle ground, between independence and structure, somehow. Because otherwise, you can research all you want and not reach a specific endpoint. (P10, Natural Sciences and Engineering)

The quote above shows that the respondent experienced a lack of structure provided by their supervisor. This was a recurring theme during the interviews and manifested itself in different ways: a lack of feedback or non-constructive feedback, irregular meetings or meetings in which there is no space to discuss what is important, and a lack of expertise of the supervisor or a lack of involvement, both fueling the impression that the supervisor is insufficiently aware of the status of the research. As one respondent stated: "*Sometimes I wonder if he really knows what I'm doing, and I'm thinking: am I doing enough? And he says [that I am] doing enough. But I'm not sure if that's true, because I'm not sure he really knows what I'm doing.*" (Human Sciences). One respondent expressed frustration that although his supervisor had the right expertise, she did not share this because she was too busy. Although flexibility and freedom were the most frequently mentioned positive elements of the PhD trajectory, those with a supervisor who provided a clear structure in their guidance were much more satisfied than those who lacked it altogether. Several respondents indicated that when their supervisor(s) gave them absolute freedom, it made them feel like they did not really care. For most respondents, regular, recurrent meetings (e.g., once or twice a month) were the best way to work. It gave them a point to work towards and a chance to get feedback and ask questions.

Dynamics that Cultivate Confusion Between Autonomy and Chaos

In this section, we discuss the dynamics that contribute to the confusion between autonomy and chaos. This corresponds to our third research question. One strength of the focus group methodology is that participants react to each other's experiences and testimonials. Several respondents were surprised by the great variety of individual experiences of the PhD trajectory. They concluded that their experience is largely shaped by luck and circumstances, such as the supervisor or research group they work with, highlighting the highly individualized nature of the process. One could argue that the ability to handle a high degree of freedom is an essential asset for a good PhD candidate, and many agree that self-discipline and proactive behavior are inherent in a PhD. However, recurringly, the interviews revealed that the tension between autonomy and chaos was not just due to personal shortcomings. Structural factors within the PhD trajectory caused difficulties in dealing with autonomy. This confusion between autonomy and chaos appeared to be related to the relationship between the supervisor and the PhD candidate's role perception.

Supervisor relationship

A supervisor should be supportive of autonomy and freedom but also find a balance between autonomy and regulations. Failing to provide sufficient structure contributes to PhD candidates' feeling of chaos. This affected the PhD candidates in two ways. First, respondents often felt intimidated to contact their supervisor. As shown in the following two quotes, they felt that their supervisor was already too busy, and they were unsure whether their issues were important enough to contact them.

> I feel a little guilty every time I come up with a question or comment, or ask for some feedback. (P11, Human Sciences)

> I find it hard to claim that time. So usually when I have a meeting scheduled for an hour, it's like … after half an hour and I'm like: (…) this is not important enough to discuss. While it might be useful … But because I value their time more than my own time, I don't claim it. (P12, Human Sciences)

Second, respondents expressed difficulties in addressing problems or their dissatisfaction with the support of their supervisor. They were very aware that a conflict could damage the relationship and lead to negative outcomes for them. As one respondent stated: "*We have been learned not to hurt the ego of the supervisors. It's a common saying, I suppose."* Reporting issues to external actors (e.g., an ombudsperson, HR department) was perceived as risky or even useless by some.

> You don't want to break that connection. I think… sometimes people from [HR] don't really get that connection. And they're like 'Yes, we will solve it, as an HR department'. But it's not … that connection is not the same … (P13, Natural Sciences and Engineering)

Both negative outcomes were related to the great dependency PhD candidates felt towards their supervisor. The quote above illustrates that the relationship with the supervisor was not perceived as a typical employer-employee relationship. Instead, it was often described as *"tricky"* and *"sensitive."* Supervisors themselves were seen as highly autonomous and functioning in a highly decentralized manner. As a result, respondents felt that they had little choice if they were dissatisfied with their supervisors' support and had no other option than to accept the situation.

> Also, because I have experience with abuse of power within the academic world, that's also purely because you have that decentralization somewhere, and the professor who can completely decide how to organize his department and, how the communication goes and what he can expect from PhD candidates. (…) there is certainly still work to be done there … so that those things can be avoided in advance, that there are clear rules … (P1, Human Sciences)

The quotes above describe a lack of a centralized control mechanism for supervisors. Due to this, respondents considered the relationship and collaboration between a supervisor and PhD candidate to be something very individual that must be settled "privately" between both parties. This led to a great variety of candidate-supervisor relationships. For some, the manageability of the relationship with the supervisor created space for independence. This indicates that looking beyond the employee-boss relationship is essential to growing into an independent researcher. For others, the freedom to shape the relationship with the supervisor merely enforced a feeling of dependency. The nature of this dependency differed between disciplines. PhD candidates in human sciences, natural sciences, and engineering felt very dependent on their supervisor because the supervisor was the only person who was familiar with what they were doing in their research. The relationship with their supervisor was less hierarchical, but there seemed to be more often a sense of loyalty towards the supervisor. This feeling resulted from the awareness that they really needed the supervisor to succeed. In the life sciences and medicine, there seemed to be a much stronger hierarchical culture. These PhD candidates could more often count on colleagues with similar expertise or experiences and often saw their supervisor as a boss who was above them.

Despite the nature of the relationship with the supervisor, it appeared that when too much freedom was given (i.e., when there was a lack of structure or initiative on the part of the supervisor), within the context of this power-dynamic, this discouraged proactive behavior in PhD candidates and often left them feeling lost and abandoned. In these cases, respondents found it very difficult to take responsibility for initiating contact, asking questions or feedback, and often retreated into a state of passivity. Proactive behavior, which, according to previous literature, should be cultivated by autonomy support, seemed to be replaced by passive acceptance of a situation, as illustrated in the following quote.

> You want to do something about it, but on the other hand, well, what can you do about it? I mean, someone can tell him, 'You're not allowed to do that anymore,' but who's to say that he's going to care about that, and then it might get even worse. Well, that's always a bit of a balancing act. (P14, Life Sciences and Medicine)

Role perception

The confusion between chaos and autonomy may result in self-doubt, and the dynamic contributing to this is the prevailing idea that PhD candidates are – or should be – *experts* in their field. The latter is fueled by the metric-driven performance markers and a strong focus on productivity that characterizes academia. This idea appeared to reinforce the tendency for supervisors to give PhD candidates much autonomy. Several respondents mentioned that they felt that their supervisors trusted them to make progress and that they knew what to do and how to do it.

> I've been [several] weeks without contact with him. (…) I think he just trusts us very much or something and thinks: 'It'll be fine, if you need me, you'll contact me'. But for me it's more like: 'You don't care about me'. (P5, Human Sciences)

> (…) I think there needs to be some … at least SOME evaluation. Because otherwise, you're like: 'Where am I? Am I doing well or not?'. And I like to have that … not validation, but that they tell me if it's ok or not." (P10, Natural Sciences and Engineering)

> I could be teaching them that the evolution theory is wrong, and no one would know. (P15, Natural Sciences and Engineering, commenting on the lack of evaluation of their teaching skills)

These quotes illustrate that for many respondents, the high level of autonomy and trust that they should know what they are doing raised doubts. Many felt that they were doing things wrong and that quality checks and evaluations were missing.

Being expected to be an expert (i.e., already possessing relevant knowledge) denied some respondents the ability to follow courses or workshops. In contrast, these respondents felt that they lacked opportunities to further develop themselves and meet other interesting researchers. The feeling of being seen as an expert was particularly present among PhD candidates who were hired to fill in a "gap" in the specific expertise of a research group. While supervisors were proud to offer the PhD candidates their own projects, it was sometimes difficult for them to work on a topic that no one else was familiar with and could help them with. This dynamic was enforced when there was no middle group of postdocs in the research groups between professors and PhD candidates.

PhD candidates often did not perceive themselves as experts, which became clear when they described their role perception, often without interviewer probes. Only one respondent explicitly said he felt like a student because he was still learning a lot. All other respondents indicated that they no longer felt like students. However, it was interesting to see that the way they identified themselves seemed to vary according to the context.

Respondents emphasized to people outside academia that their PhD was a job and that they were working as researchers, not studying. In a way, this was a strategy to cope with the expectations outsiders had when they heard the term 'PhD candidate.' Respondents mentioned that people felt somewhat intimidated when they heard they were doing a PhD.

> (…) people in my family or friends are so disconnected from the academic domain that sometimes they don't really understand what I do. But there's always this perception of: 'Oh, because you're working on your PhD, you're probably really smart', you know, those kinds of things. And internally, you're thinking: 'Yeah, but I feel stupid all the time.' (P16, Human Sciences)

The quote above shows that people around them assumed that they were exceptionally smart. Respondents tried to downplay this. By not using the term PhD candidate and emphasizing that they were a researcher, they were able to manage the expectations that others had of them.

On the other hand, within the academic context, several respondents admitted feeling more like someone who is still learning. For example, when they were in a meeting with their supervisor or at an academic conference.

> How I identify myself also changes as it suits me. I'm going to be honest about that. Sometimes, I'm a student, and sometimes, I'm a researcher. It really depends. (…) in front of peers who are higher up … well, 'peers,' they're not really peers, but you know what I mean … in the academic world, you're more likely to say 'PhD candidate' than 'researcher,' I personally think. Certainly, at conferences or something … At conferences, that's actually the best example. That you install yourself in a kind of underdog position. Instead of saying, 'I'm a researcher on that topic so I'm an expert', no, 'I'm still on my way to becoming an expert.' In that way. (P12, Human Sciences)

This shows that outside of academia, respondents used the term researcher to downplay the expectations others associate with being PhD candidates. However, within academia, the term "PhD candidate" emphasizes their rookie status and underlines that they are not yet expert researchers. The intended outcome was the same in both cases: respondents tried to avoid the perception of being an expert. This would give them the feeling that they can make mistakes and have the space to grow as researchers. In this way, it provides a specific manifestation of their more general need for structure, evaluation, and support.

DISCUSSION

In this paper, we investigated how PhD candidates experience autonomy. Respondents considered autonomy a vital part of their PhD trajectory. Pursuing a PhD involves knowledge creation and exploring the unknown, which is best done without too many constraints. Respondents considered doing a PhD a creative, dynamic, and challenging trajectory on which they embark individually and through trial and error.

We contributed to this paper by investigating how PhD candidates experience autonomy in their doctoral process while paying attention to different dimensions of autonomy. We found that *strategic autonomy* (i.e., regarding research agenda and content; Woelert et al., 2021) was rarely featured in the respondents' narrative. Two important reasons for this are the type of funding channels and the idea of "publish or perish" that characterizes a decreasing institutional autonomy. Respondents funded based on pre-written research projects felt that they mainly performed research. Others emphasized "publishing" as their main task. This relates to decreasing institutional autonomy, where standardization (e.g., of funding applications) and decision-making based on performance measures (e.g., number of publications, research grants, and PhD candidates) puts great pressure on the independent, self-administered, and self-governed character of universities (Enders et al., 2013). In fact, when respondents talked about autonomy, they mainly referred to *operational autonomy* (i.e., regarding the conduct and organization of research; Woelert et al., 2021). Specifically, they referred to the importance of getting freedom in terms of time allocation. Not only to be able to work where and when they want but also to prioritize time across (research) tasks and allocate it to following courses.

Experiencing operational autonomy and not experiencing strategic autonomy makes autonomy seem like Berlin's (1969) "negative freedom" for many respondents. We contribute to the existing literature by confirming that autonomy tends to be experienced as chaos, as PhD candidates mention a lack of expectations, control, interaction, and supervisory support as the pitfalls. Respondents did not know what to do and when they had done enough. They missed boundaries in their temporal-spatial flexibility, which allows them to interact with colleagues, ask for help, or feel less socially isolated. They

wished for more constructive feedback, regular meetings, and supervisor involvement. So, whereas respondents expected academic autonomy (i.e., strategic and operational freedom; Woelert et al., 2021), they mainly found negative freedom (i.e., absence of authoritative powers and interference; Berlin, 1969) in their PhD trajectory.

This poses major challenges to the equality of opportunities and outcomes of PhD candidates, as not everyone is equipped to deal with this autonomy. Additionally, it is not considered satisfying, while satisfaction with autonomy is important in stimulating proactive behavior (Grant & Ashford, 2008; Strauss & Parker, 2014). Instead, several respondents retreated to a state of passive behavior. They refrained from asking questions and feedback and were reluctant to take up the time of the supervisor. Even asking for help from external parties or services for more serious problems proved difficult. However, our results show that this is not just about personal shortcomings. We thus contributed by identifying three structural factors or dynamics within the PhD trajectory that are partly responsible for this.

First, many supervisors fail to provide autonomy support or positive freedom (cf. Berlin, 1969). They are rather absent and do not provide a structural context within which PhD candidates are free to realize their own goals and actions (i.e., to experience ownership over their research and demonstrate proactive behavior).

Second, the supervisor-supervisee relationship is different from an employer-employee relationship. Although many respondents consider this form of mentoring desirable, they also emphasize the dependency of such a relationship. This perceived dependency makes PhD candidates see it as a risk to take the initiative or to go against their supervisor (coined as "supervisor phobia" by Diamandis (2017)), which is at odds with the autonomous, proactive behavior that should constitute the academic freedom of PhD candidates. The cost-benefit calculations and expected regret of taking certain actions in some cases lead to decision avoidance (Anderson, 2003). The fact that supervisors operate in a highly autonomous and decentralized manner, the mostly lack of accountability, and the heavy weight of the final evaluation (i.e., the defense of the dissertation) contribute greatly to this feeling. This shows again how important it is that supervisors create a structural context and formulate expectations within which PhD candidates can operate freely.

Third, the confusion of chaos with autonomy or the experience of negative freedom cultivates self-doubt, insecurity, and impostor syndrome among PhD candidates. This comes down to their conflicting role perception. PhD candidates often assume supervisors view them as experts in terms of knowledge and project management, whereas they prefer to present themselves as "learners" among peers (i.e., at conferences). Indeed, this role conflict among PhD candidates has already been shown and discussed in previous research (e.g., Lei & Hu, 2019; Skorobohacz, 2013). Role perception of PhD candidates is an important factor to consider as it relates to their self-efficacy: those who perceive themselves as students show higher levels of self-efficacy (Glorieux et al., 2024). Next to providing autonomy support, a research context should stimulate PhD candidates to ask questions and allow them to make and learn from mistakes.

A final contribution is to show that while all these patterns occurred across different scientific disciplines, there was also some variety in where the emphases lay – especially those in life sciences and medicine, which seemed to differ from the other disciplines. These respondents hardly ever mentioned strategic autonomy. Their project seemed to be more clearly defined than that of others, which made this seem less applicable. In addition, these respondents experienced loneliness less often. They felt considerably less isolated because their research tended to be more active (e.g., working with patients, working in labs, etc.). Finally, although these respondents also felt a strong dependency on their supervisor, the nature of this dependency was different. Life Sciences and Medicine are characterized by a much stronger hierarchical atmosphere than other disciplines. Even more important, however, were the differences within doctoral schools. Indeed, even PhD candidates from the same discipline reported very different practices in terms of supervision. In that sense, the autonomy of

the supervisors sometimes did not fit with the need for autonomy of the PhD candidates. This finding underlines the importance of distinguishing between scientific disciplines when conducting research into PhD candidates or the PhD trajectory.

CONCLUSION

Academic autonomy is highly valued and expected by PhD candidates. Yet, strategic autonomy is hardly experienced, and operational autonomy is often experienced as a form of negative freedom. For PhD candidates to create groundbreaking knowledge and discover the unknown, it is necessary to create a research context in which autonomy is experienced as positive freedom, a context in which PhD candidates are free to realize their own goals and actions.

RECOMMENDATIONS

Both institutions and supervisors play an important role in creating this context. On the one hand, institutions must be very vigilant against the corporatization of academia because decision-making processes based on performance measures undermine their academic autonomy. On the other hand, they should also be careful that this academic autonomy at the level of supervisors does not lead to a free pass to do whatever they want when it comes to supervising PhD candidates. Implementation of accountability or evaluation structure and clear guidelines are indicated here. Examples include training programs for supervisors, allowing multiple supervisors per PhD candidate to reduce dependency on a single supervisor, better follow-up of the advisory committee of PhD candidates, limiting the number of PhD students per promotor, and assisting in the recruitment of new PhD candidates to achieve a better match between supervisor and supervisee. Also, mandatory co-supervisorship before you can become a main supervisor could be an interesting route, as it has been shown that co-supervisors learn a lot from their supervisor-colleagues, both about the topic and about supervisory practices (Olmos-López & Sunderland, 2017).

The first step to implementing practical changes is to closely monitor doctoral students' and supervisors' needs and experiences. It is then important to close that feedback loop by translating findings into action. An example is the University of Canterbury, where the results of a survey of postgraduate students were used as input for specific modules in supervisor training, such as feedback and communication (Johnston et al., 2016). The subsequent surveys showed increased satisfaction with the targeted issues over the following years.

Supervisors play a crucial role in supporting autonomy in a way that PhD candidates experience it as positive freedom. Points of attention here include limiting spatiotemporal freedom so that PhD candidates and other colleagues have the opportunity to interact with each other regularly. Also, implementing more group meetings, departmental seminars, and opportunities to present their research to one another has proven successful (Johnston et al., 2016). Furthermore, it provides a controlling and intervening structure in the form of constructive feedback and regular appointments, ensures a knowledge match between supervisors and the topic of their PhD candidates, and creates a learning environment in which PhD candidates can be both experts and novices. In this sense, a "student-supervisor agreement" might be useful. This involves a document where both parties align and agree upon each other's expectations. A practical example is the Feedback Expectation Tool, which encourages a dialogue between PhD candidates and supervisors (Stracke & Kumar, 2020).

LIMITATIONS AND FUTURE RESEARCH

This study has some limitations. First, respondents were recruited via an open call. It can be assumed that many of those felt the need to share their story and wanted to address negative experiences they might have had. People without specific issues or a more neutral experience might be less incentivized to participate. Second, this study made use of focus group interviews. During group interviews,

respondents elaborate on what others have said before. In principle, this is the strength of this methodology, but it also implies that conversations develop in a specific direction, which may influence the respondents' testimonies further. Both elements could have caused testimonies to be more critical or negative. This is not a weakness of our study but something to consider. Third, although we consider nine focus groups comprising 42 respondents a quite substantive sample, all respondents came from the same institution. This guarantees that differences within the sample cannot be attributed to differences in the institutional context. However, it also raises the question of whether and how the institutional context matters in this subject area. In Belgium, the differences between universities are relatively small. PhD candidates are well paid, and there are many opportunities for talented people who want to pursue a PhD. Further research could thus take an international comparative focus. The influence of the institutional arrangements may be more relevant in countries where the competition between institutions is fiercer, and differences are therefore greater. Future research should address these aspects: how does autonomy take shape as a product of a dialogue between supervisors and PhD candidates? What support do supervisors need to be autonomously supportive? And how do supervisors try to be autonomously supportive in the heterogeneous group of PhD candidates? And how do institutional differences influence within-university dynamics regarding PhD trajectories? Moreover, while we discussed two applications of dynamics in the PhD trajectory that cultivate the confusion between autonomy and chaos, more could be defined. Future research could focus on elaborating on additional dynamics that complicate dealing with autonomy.

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APPENDIX

Table A1. Sample size of focus groups and interviews (n=42)

	Discipline	Type of appointment	Number of participants
Focus group 1	Human Sciences	Project funding + personal mandate	5
Focus group 2	Human Sciences	Teaching assistants	5
Focus group 3	Natural Sciences and (Bioscience) Engineering	Project funding + personal mandate	6
Focus group 4	Natural Sciences and (Bioscience) Engineering	Teaching assistants	4
Focus group 5	Life Sciences and Medicine	Project funding + personal mandate	4
Focus group 6	Human Sciences	Project funding + personal mandate	4
Focus group 7	Natural Sciences and (Bioscience) Engineering	Project funding + personal mandate	3
Focus group 8	Life Sciences and Medicine	Teaching assistants	4
Interview 1	Human Sciences	Teaching assistants	1
Interview 2	Human Sciences	Personal mandate	1
Focus group 9	Human Sciences	Teaching assistants	4
Interview 3	Human Sciences	Personal mandate (previously self-financed)	1

Table A2. List of general topics and subtopics

General topic	Subtopic
General ideas regarding being a PhD candidate	Positive elements of being a PhD candidate
	Challenges of being a PhD candidate
	Elements necessary for successful PhD trajectory
Supervisor support	Supervisor's approach to supervision
	Expectations regarding supervisor's responsibilities
	Conflicts with supervisor

	Relationship with supervisor
	Other actors involved in support (apart from the supervisor)
Collaboration and competition	Experiences regarding collaboration with other researchers
	Work culture in a research group
	Competition in the work environment
Time use	Performing tasks other than research Control over worktime
Role: student or employee	
Ideas to improve doctoral training	
Advice for starting PhD candidates	

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