Supervisors' Perceptions of Primary Resources and Challenges of the Doctoral Journey

Solveig Cornér, Kirsi Pyhältö, and
Erika Löfström
University of Helsinki

The focus of this study was to explore doctoral supervisors' perceptions of the factors contributing to doctoral studies. The study draws on the job demands-resources (JD-R) framework to analyze supervisors' perceptions of core resources and challenges at different levels of doctoral education. The data comprise 15 semi-structured interviews with professors in their roles as supervisors in economics, medicine, natural sciences, engineering, humanities and social sciences at three Finnish universities. The supervisors identified a variety of resources and challenges related to structures, organization of doctoral studies, the scholarly community, supervisory relationships, and individual competence. Slightly more challenges than resources were identified. The challenges described were related to structural elements and embedded in the research community, whereas many of the perceived resources were associated with social aspects of work. The results highlighted the importance of different supervisory resources such as a good supervisor-student relationship, support of the research team, and international contacts, as ingredients of high-quality supervision in the doctoral process. The study also showed that many of the challenges require focusing on and developing the whole community rather than individuals.

Supervision has been shown to be a central determinant of the doctoral experience (Cornér, Pyhältö, & Löfström, 2017; Ives & Rowley, 2005; Pyhältö, Vekkaila, & Keskinen, 2012b; Zhao, Golde, & McCormick, 2005). Researchers have found its contribution to study progress (Gurr, 2001; Hasrati, 2005; Ives & Rowley, 2005), to enculturation (Dysthe, Samara, & Westrheim, 2006; Lee, 2008), to the completion of the doctoral studies (Lovitts, 2001; Peltonen, Vekkaila, Haverinen, Rautio, & Pyhältö, 2017; Pyhältö, Vekkaila, & Keskinen, 2015), and to well-being among doctoral students (Hunter & Divine, 2016; Ives & Rowley, 2005; Lee, 2007; 2008; Pyhältö, Stubb, & Lonka, 2009; Pyhältö et al., 2012b). Constructive feedback, social support, frequent supervision, and a functional relationship with the supervisor facilitate doctoral students' satisfaction with the doctoral program, timely completion of studies, and satisfaction with supervision (Cornér et al., 2017; Gardner, 2007; Golde, 2005; Ives & Rowley, 2005; Peltonen et al., 2017; Pyhältö et al., 2012b; Seagram, Gould, & Pyke, 1998; Stubb, Pyhältö, & Lonka, 2011; Wao & Onwuegbuzie, 2011). Accordingly, there is a strong body of evidence to show that the supervisor plays a central role in the doctoral experience and study progress. Students perceive access to resources provided by supervisors, , and learning opportunities within academia to be of vital importance (Pearson & Brew, 2002). The choices that supervisors make about supervision are influenced by their underlying beliefs about the factors that will enhance doctoral studies, such as supervision or the scholarly community (Åkerlind & McAlpine, 2015). Hence, the perception of supervisors about the main regulators of the doctoral study process—that is, the

resources and challenges of the doctoral journey—guide their actions, including the supervision goals set and the activities that they employ with their students.

Previous research has identified several factors that contribute to the successful completion of doctoral studies (Gardner, 2007; Golde, 2005; Ives & Rowley, 2005; Pyhältö et al., 2012b; Stubb et al., 2011). However, there has been less research on how key factors are identified in terms of the resources and challenges that influence the actions of supervisors in the supervisory process. Given the importance of their perceptions of key factors, supervisors also need to identify the location of the key regulators in the structure of doctoral education. The aim of the current study is to gain a broader understanding of doctoral supervision, including the key regulators at the various systemic levels of doctoral education. The objective of the study was to identify the main factors contributing to successful completion of doctoral studies and their manifestation as the resources invested and the challenges recognized in the system, at the level of an individual, a research community, or a structure. As is known from prior research, supervision is a central determinant of the doctoral experience (cf. Cornér, Pyhältö, & Löfström, 2017; Ives & Rowley, 2005; Pyhältö et al., 2012b; Zhao et al., 2005). We have therefore approached the objective from the perspective of the supervisor.

Key Regulators as Resources and Challenges in Doctoral Education

The key regulators of doctoral education comprise a range of factors that either contribute to (in this study referred to as "resources") or hinder (in this study

referred to as "challenges") the doctoral study process (Pyhältö et al, 2012b). Resources and challenges may be different in different surroundings. However, it has been suggested that resources in doctoral education should be identified as both individual factors such as motivation and as environmental factors such as supervision, feedback, and support (Gardner, 2007; Golde, 2005; Hlebec, Kogovšek, & Ferligoj, 2011; Ives & Rowley, 2005; Pyhältö et al., 2012b; Stubb et al., 2011).

This study draws on the Job Demands-Resources Model (JD-R) (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) to explore supervisors' perceptions of key regulators such as the resources required and the challenges of completing doctoral studies. The JD-R model provides an explanation of the relationship between two sets of working conditions: job demands and job resources (Bakker & Demerouti, 2007). The model assumes that there are both demands and resources in a working environment, and it emphasizes the relationship between the demands and resources rather than either one as such (cf. Demerouti et al., 2001). Job demands refer to physical, psychological, social, or organizational aspects of the work that require ongoing psychological or physical efforts or skills (Bakker & Demerouti, 2007; Demerouti et al., 2001; Schaufeli & Bakker, 2004). Accordingly, job demands in terms of supervision in the doctoral process are typically comprised of the challenges doctoral students need to overcome in order to complete their doctoral studies, and for which they need help from their supervisors. Particularly, supervisors have been found to emphasize demands related to the organizational level such as the absence of fixed structures for funding, time allocation, and the organization of doctoral education (Pyhältö et al., 2012b). Job resources, on the other hand, are the physical, psychological, social, or organizational features of the work that are instrumental in achieving goals, reducing work demands (and the physical/psychological demands associated with them), and stimulating growth and development. Job resources can be the opportunity to develop competencies, to contribute to the research in their field, and to receive social support from the scholarly community (Pyhältö et al., 2009; 2015, Vekkaila, 2014; Vekkaila, Virtanen, Taina, & Pyhältö, 2016). Both the challenges of, and the resources applied to, doctoral studies can be situated at different levels of doctoral education. They may range from individual resources to structural challenges. Hence, the system of doctoral education is a multiplex, and it includes the resources and challenges at various levels (Pyhältö, Toom, Stubb, & Lonka, 2012a). In this study we have utilized the JD-R model to describe supervisors' perceptions of the core resources and challenges contributing to the doctoral study process.

Prior research on doctoral supervisors shows that supervisors perceived sufficient funding as one of the more central resources of doctoral studies (Gardner, 2009; Pyhältö et al., 2012b). They also emphasized interactions with other researchers and peers and a cooperative atmosphere in both their own scholarly community and an extended international scholarly community as valuable resources (Pyhältö et al., 2012b; Pyhältö et al., 2015; Vekkaila et al., 2016). Moreover, student competencies have been identified as a central resource by supervisors (Barnes & Austin, 2009). Barnes and Austin (2009), for instance, have proposed that such resources are conceptual understanding, knowledge, and specific research competence (as in key areas of faculty work), as well as interpersonal skills and a professional attitude possessed by doctoral students. In turn, recent research on doctoral supervisors reveals that supervisors perceived financial insecurity as a central challenge of doctoral studies (Jones, 2013; Pyhältö et al., 2012a). Supervisors also underline the bureaucratic aspects of repeatedly applying for funding as a challenge (Pyhältö et al., 2012b) and in orchestrating the research process by themselves (Vehviläinen & Löfström, 2014). In other words, an absence of collegial structures in supervision and other requirements obstruct the provision of the highest quality supervision at all times.

Considering our aim to identify key regulators in the doctoral process and the affordances provided by the analytical framework described above, we set the following research questions:

(1) What key regulators (that is, resources and challenges) do supervisors identify in doctoral studies?
(2) At the systemic level of doctoral studies, where are the key regulators of doctoral studies identified by supervisors located?

Context

Doctoral education in Finland is less structured and is more research and teaching orientated than the more fixed and framed coursework-based model in the USA, for example (Andres et al., 2015). Students need to apply to undertake doctoral education after they have obtained their master's degree. In the Finnish context, doctoral students are engaged in conducting research from the very beginning of their studies. In parallel to writing a doctoral thesis, a doctoral student completes compulsory coursework and takes part in courses, seminars, and conferences (from 40 to 60 units in the European Credit Transfer and Accumulation System, ECTS), depending on discipline. Students need to apply to be accepted to undertake doctoral education and write a research plan of high quality. A doctoral thesis

in Finland can be completed either in the form of a monograph or as a series of three to five peer-reviewed articles that includes a summary (Finland's Council of State, 2004). Currently, the dominant thesis format is the one involving the peer-reviewed articles (Pyhältö, Stubb, & Tuomainen, 2011). The articles are often written with the supervisors or other co-authors, such as senior researchers. The students have at least one supervisor, who is the equivalent level of associate professor in the relevant field, and often the student also has a second supervisor. At many Finnish universities, the policy for doctoral education requires at least two supervisors. A supervision contract on how they will work together is usually co-written by the supervisors and the doctoral student. Templates for the contract are typically provided to ensure that supervisors and doctoral students agree about core responsibilities and practices. The language of the supervision process depends on the native language of the doctoral student, the dominant language of the doctoral program, and status of the student as Finnish or an international. Doctoral education is publicly funded, and there are no tuition fees. Typical funding sources are grants from foundations, project funding, doctoral student posts at the university, and work outside of the university (Pyhältö et al., 2011). A description of doctoral education in Finland is available in Pyhältö, Nummenmaa, Soini, Stubb, and Lonka (2012).

There has been interest nationally in developing supervision in the context of doctoral education. For instance, the Finnish Advisory Board on Research Integrity and Universities Finland (UNIFI), the co-operational organization for Finnish universities, issued guidelines for the supervision of doctoral students and review of their dissertations in Finland with an emphasis on assuring research integrity throughout the process (Finnish Advisory Board on Research Integrity & UNIFI, 2016). While these guidelines are non-binding, it is noteworthy that they address factors in the regulatory framework as well as the supervisory practices embedded in the research community.

Methods

Participants

The empirical data consisted of interviews with 15 PhD supervisors at three Finnish universities. The universities have in common that they cater for the minority Swedish-speaking population in Finland and, more specifically in our case, doctoral students and their supervisors, a group which has not been systematically researched in the Finnish context. The supervisors represent different disciplines, genders, and experience as supervisors. The participants were Swedish-speaking supervisors (eight female and seven
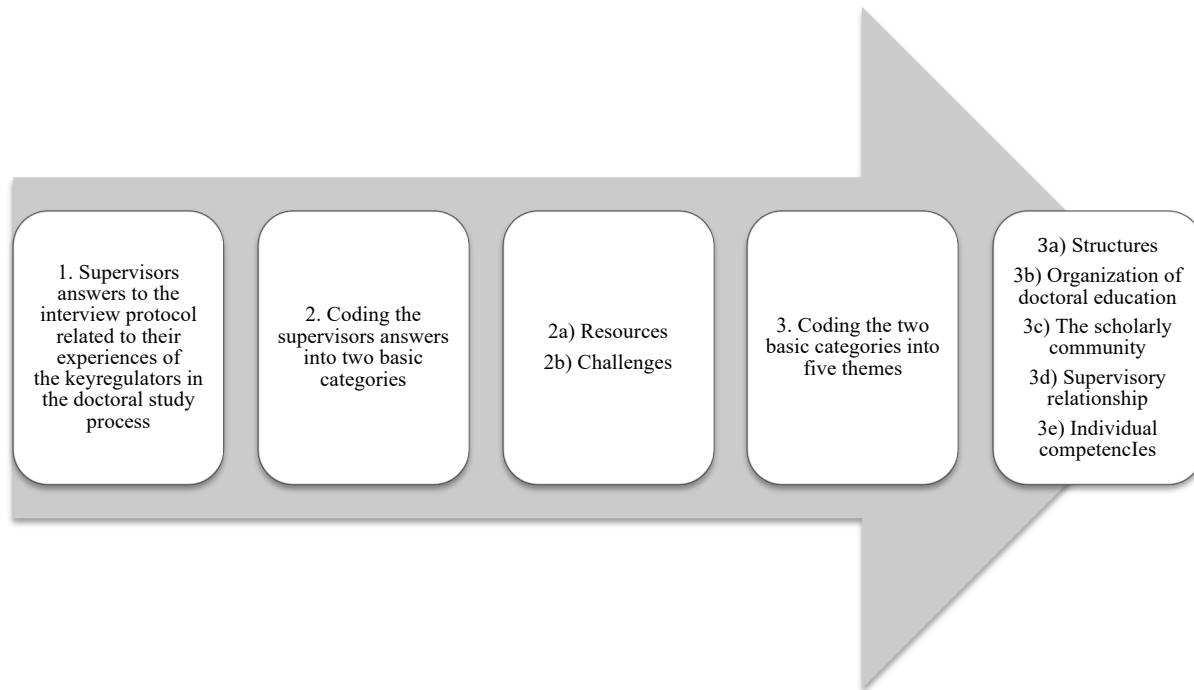
male) working in 15 degree programs in which the major part of the program was in Swedish. They were all full-time professors representing the humanities (1), social sciences (5), economics (2), medicine (3), natural sciences (3), and engineering (1). The length of experience in doctoral supervision ranged from 5 to 25 years. Between them, the supervisors had supervised over 115 doctoral students. On average, the professors were currently supervising eight doctoral students each. The participants were purposefully recruited as they were known to be among the more experienced professors in their respective degree programs and, therefore, could be expected to have a broad overview of doctoral education.

Data Collection

The data were collected between May and August 2013. The choice of including three universities offered an opportunity to look at supervision in a transitional process of the reorganization of doctoral education in both institutional and national contexts, including the introduction of a new funding scheme for doctoral education in Finland. The resources and challenges perceived by supervisors were analyzed from semi-structured interview data (cf. Kvale, 1997). The interview protocol has been reported in Löfström and Pyhältö (2012). The interview instrument was piloted with three supervisors at one university. Only minor modifications were made to the questions, and the pilot interviews were included in the analyses of the study. The interviews consisted of 15 main questions. The interview questions relevant for our purposes drew on the JD-R model, and two questions explicitly addressed the supervisors' perceptions of key regulators in the doctoral study process. Hence, their perceptions of resources and challenges were reflected by their answers to these questions. The questions that were asked were, "Could you give examples of factors that facilitate the studies of doctoral students?" and "Could you give examples of factors that impede or challenge doctoral students in their studies?" No explicit question was asked about the supervisors' perceptions about core resources and challenges at different systemic levels in doctoral education. The systemic location of the key factors emerged in the interviewees' responses about resources and challenges. Further, seven background questions on the working history of the participants, range of supervisory experience, and current number of doctoral students was included.

The participants were invited by email to participate in an interview. Eighteen supervisors were requested to participate, of whom three declined the invitation. The interviews were conducted in Swedish, and each interview lasted 30–50 minutes. The interviews were recorded and transcribed verbatim. Participation in the

Figure 1.
A description of the analysis

| 1. Supervisors answers to the interview protocol related to their experiences of the keyregulators in the doctoral study process | 2. Coding the supervisors answers into two basic categories | 2a) Resources 2b) Challenges | 3. Coding the two basic categories into five themes | 3a) Structures 3b) Organization of doctoral education 3c) The scholarly community 3d) Supervisory relationship 3e) Individual competencIes |

research was voluntary and based on informed consent. No incentives were offered. In order to protect the participants' anonymity, more detailed information about gender or institution has not been provided in this article. The research adhered to the ethical guidelines established by the Finnish Board on Research Integrity (2012). According to the Finnish regulatory framework (Finnish Board on Research Integrity, 2012), the study did not require an ethics review.

Data Analysis

In the data analysis process, we investigated the key factors of the doctoral study process, which supervisors referred to in their answers. Through these experiences, the perceptions of supervisors about the key regulators could be further categorized as resources and challenges in the doctoral study process, and five sub-themes were identified among the resources and challenges.

The data were analyzed through theory-driven content analysis (Marshall & Rossman, 1995). The strategy of the data analysis included both inductive and deductive processes. As shown in Figure 1, initially all the text segments (a unit of analysis was a whole text segment) in which supervisors referred to the primary regulators of the thesis process were coded into the same category by using an inductive strategy (Holyoak & Morrison, 2005). A text segment is defined here as an extraction from the data describing a full thought or theme and its immediate elaboration. The length of the text segments ranged from one to several sentences. The text segments coined an idea of something that is necessary, important, or useful for doctoral students or something that is the opposite of such aspects. Thus, the text segments contained attributes that the supervisors emphasized as either important or referred to as dissatisfactory. The following text is an example of a text segment coded as a resource and, further, coded as the sub-theme *The scholarly community*: "Well, during the years I have noticed that it is really important that the students have the opportunity to be a part of the research community and, also, not to be too far away from each other". This segment coins the idea of the importance of doctoral students having access to a community. Community is seen as a facilitator of the doctoral process. In the first step, 217 text segments of key regulators were identified. The analyses process is illustrated in Figure 1.

After this initial recognition of the key regulators, the second phase in the analysis process proceeded with a deductive approach (Levin-Rosaliz, 2004; Morgan, 2007). The supervisors' answers were coded into two basic categories: (1) *Resources* and (2) *Challenges* in the doctoral study process. The basic category (1) *Resources* included text segments in which the supervisors described processes on the doctoral journey

Table 1.
Resources and Challenges on the Doctoral Journey: Frequencies and Percentages

Subcategories	Resources f (%)	Challenges f (%)	Total f (%)
Structures	9 (9)	36 (30)	45 (21)
Organization of doctoral education	19 (20)	30 (25)	49 (22)
The scholarly community	28 (29)	11 (9)	39 (18)
Supervisory relationship	22 (23)	15 (13)	37 (17)
Individual competencies	19 (19)	28 (23)	47 (22)
Total	97 (45) 100 %	120 (55) 100 %	217

that worked well, promoted the thesis process, and were perceived positively by the supervisors. The text segments described as resources also contained issues that the supervisors emphasized as important and crucial for succeeding in the thesis process. In addition, the basic category for (2) *Challenges* contained text segments in which the supervisors described processes that present obstacles to the thesis process. The description of challenges also included text segments referring to problems and difficulties, such as lack of support or challenges in other ways, which led the supervisors to express their dissatisfaction. In the second phase, 97 text segments pertaining to the category of Resources and 120 text segments pertaining to Challenges were identified.

Finally, in the third phase, an inductive approach in the analysis process was taken in order to develop a framework of the underlying structure of the perceptions of supervisors about the resources and challenges. In the text segments, we identified a set of descriptions of funding, infrastructure, and physical facilities that the institution offers to doctoral students. We formed a category and named it *Structures*. A second set of excerpts that we identified described human resources and administrative processes, including the recruitment process of doctoral students and training. We named this category *Organization of doctoral education*. Another category we found was *The scholarly community*. In this category we identified explanations related to the participation by students in the scholarly community, in research groups, to the support of the team and to international contacts. We discovered text segments that contained descriptions of the supervisory relationship with the students, the frequency of supervision, different supervising practices and networking, and interactions among supervisors. This category we called *Supervisory relationship*. Finally, we recognized descriptions of both generic and research-specific competencies of doctoral students, and we named the category *Individual competencies*. These five data-driven sub-themes were found among both resources and challenges.

The first author conducted the three phases of the analysis processes. Between the different phases, the authors discussed the interpretation of the original transcribed interview texts. The authors validated the categories at the end of each stage of the analysis process. The quotations that were chosen to illustrate the basic and the sub-themes were translated into English.

Results

Supervisors' Perceptions of Primary Resources and Challenges in Doctoral Studies

The results show a variation in the perceptions of supervisors of the key regulators in completing a doctoral thesis. The nature of the resources described ranged from the scholarly community, such as support of their own research team and international co-operation, to the supervision process, such as learning with the doctoral students. In turn, the perceived challenges were often connected to structural elements, such as financial resources. Also, the lack of a systematic doctoral education process, including the reorganization of doctoral education, was perceived as a challenge. The resources and challenges encompass *structures*, *organization of doctoral education*, the *scholarly community*, *supervisory relationship*, and *individual competencies.* The percentages in Table 1 refer to all the resources or challenges reported by the supervisors. Descriptive statistics have been reported to provide an overview of the prevalence of resources and challenges comparative to each other.

Supervisors' Perceptions of Primary Resources. The most common resource, almost a third of total resources (29%) mentioned by the supervisors was *the scholarly community*. The importance of a research group, the support of a team, collaboration with colleagues especially in the other Nordic countries, and international cooperation as a whole were identified as key resources within the scholarly community. The existence of shared scholarly practices and opportunities for learning from each other were also much appreciated as resources in the scholarly community. Supervisor F clarified the situation as follows:

But of course, the art of supervising doctoral students develops over the years. You also learn from the students, and…cooperation with other supervisors, yes, that I think is probably the most fruitful way of learning, you know, I mean co-supervising.

The supervisors described how when the doctoral students have the opportunity to work closely together in a research group, as well as through peer interaction, this is an essential form of support for the doctoral students themselves. As an illustration, Supervisor E explained:

I think that one factor that assists the progress of their study process is that they have other doctoral students around them who can serve as good role models.

Or, as Supervisor I described it, it is important for the scholarly community to prevent doctoral students from being isolated or left to their own devices:

In the research group, and we have a big one, we have this feeling of being together. The students receive support from each other, though it is not always me who is around to supervise. No, but there is somebody else to give support, for example, a post doc or a student in the last part of their doctoral study process and so on…and this I think is the most important thing. They should not be left alone with perhaps a feeling of being a burden on the supervisor.

Supervisors also underlined the importance of gaining experience from international research communities for the doctoral students as crucial. The following quotation illustrates the thoughts of one supervisor:

I have to say that it is extremely important to gain international experience. It is not good to stay here (at one's own university). I think that it is absolutely necessary for doctoral students to go abroad, for example on a two-month research experience. It's important because, well, Finland isn't the center of the world, you know. (Supervisor J)

The supervisors underlined the *supervisory relationship* (23%) that is integrated in the thesis process as a major resource. Networking and interaction among supervisors, their own supervising competence and its systematic implementation in the doctoral studies were identified as resources and were of importance in supervision practices. The supervisors also stated that the supervisory relationship inspired them by giving joy and inspiration and that it feels good to share encouragement and support when supervising students. As an example, supervisor H shared her thoughts:

Well, I can tell you that supervision is one of the most enjoyable tasks a professor might have. Yes, when we have our seminars, I sometimes think, "Oh…do I get paid for this too?" I think like this, when the students say that they will go home now to write more or when they say that they see clearer what they have to do now or how they can work more on this…

The responsibility of offering supervision on a frequent and regular basis was often pointed out as a resource in the supervisory relationship. One of the supervisors said:

You have to be sure that the doctoral education is an ongoing process. You have a huge responsibility, and there are many things that contribute to success and many things that can go wrong. You just have to be there. The doctoral students must know that the supervisor is always there for them as in the process. (Supervisor G).

The *Organization of doctoral education* (20% of resources) was further underlined as important in the doctoral process. The supervisors emphasized the importance of a systematic approach in doctoral education, and they reflected on the importance of the university already having strong and structured master's degree education in place. They also emphasized a high level of systematic training and well-organized planning in research groups, and further, the impact that research projects offer, an effective four-year study process, study programs in Swedish, Nordic courses, and the importance of summer schools. Courses that were specifically arranged for doctoral students, and a well-organized and transparent intake into the doctoral program were often considered to be important preconditions for a successful thesis process. Research projects in which the doctoral students took part were also mentioned as facilitating factors. One of the supervisors remarked:

We are cooperating strongly with other Nordic universities. The co-operation with courses has been very important and has been appreciated by the students. The courses run every fourth year in each of Finland, Norway, Sweden and Denmark, and these courses have been very good. (Supervisor L)

Supervisor A also emphasized the importance of organized structures in doctoral education in different research groups and the impact of the research projects the students took part in:

The students gain theoretical knowledge, the so-called subject competence they work with in their doctoral dissertation while doing the research

projects within the research groups. This is a result of the work in the research groups, where you meet every week to report on results and to discuss further planning.

Furthermore, the participants emphasized the students' *Individual competence* and the development of these during the doctoral process. Generic competence (14%), such as pedagogical skills, research ethics competence, and language skills, were emphasized more than research-specific competence (5%). Research-specific competence consisted of domain-specific know-how, methodological skills, and the ability to conceptualize the research process. One supervisor stated:

> Well, my doctoral students' language skills are very good. I would like to say that the skills are over the mean for doctoral students. They write well in English. One has been to the States and of course, these students have greater advantages in international cooperation (Supervisor H).

The *Structures* of doctoral education (that is, physical facilities for the doctoral students, infrastructure and funding) were perceived as a resource in the doctoral process to a lesser extent than the other aspects (9% of resources). Recalling that doctoral education is publicly funded and tuition fee-free for the students, the financial resources may be scarce, and this could contribute to supervisors not finding funding as a particular prevalent resource. Nevertheless, they may regard opportunities for external funding as a resource. One supervisor remarked, "When we come to the question of finances, it all depends on the research group. Does the group have money? Is extra money available?" (Supervisor A)

Supervisors' Perceptions of Primary Challenges. The supervisors perceived more challenges than resources, i.e., processes that present difficulties to doctoral studies and the thesis process. All in all, 120 statements were categorized as challenges. The perceived challenges varied from structural matters including unsatisfactory funding to a lack of research-based competence. Physical facilities for the doctoral students, infrastructure, time resources, and funding were perceived as the most common hindrance in the doctoral process, with more than one-third of the statements relating to *structures* (30%). The supervisors further described as an obstacle the shortage of proper work conditions, the lack of full-time study opportunities, and the importance of a secure financial situation. Some of them questioned whether doctoral students should be accepted into doctoral training without existing funding from a research project at the university:

> I start to be more and more skeptical about allowing doctoral students to start the doctoral study process if they don´t have at least a three-year paid contract, and not as a grant. Because you can stay motivated for a while, but then if you have to do the research along with another full-time job or the uncertainty with grants, you never know how the future will look. This is the case in my field, where we do a lot of practical research. (Supervisor O).

In addition, supervisors also worried, about the extra bureaucracy that comes with doctoral students' short-term financing, as the following quotation suggests:

> The most serious problem is always that the doctoral students who have funding for only a short period run out of money at one point. Then what? The doctoral students have to apply [for funds] from different sources and I have to write a lot of recommendations. And really, a lot of energy is consumed with this … (Supervisor L)

The supervisors also stressed the *organization of doctoral education* (25%) as a barrier in the thesis process. The statements included the concerns supervisors had of a lack of organized courses, especially in the Swedish language. More generally, the supervisors worried about a lack of structure in doctoral education. Some felt that the offered courses for doctoral students are too general and failed to provide knowledge and competencies related to more specific themes. The supervisors also pointed out challenges in the recruitment process for doctoral studies. Because of the strong competition, the supervisors saw a risk that if something fails, there might be a future shortage of doctoral candidates interested in working in academia. The competition especially for salaried doctoral study positions for Swedish speaking doctoral students was described as fierce. The supervisors worried whether there would be sufficient academic regrowth among Swedish-speaking Finns. Therefore, they also expressed concerns about whether an academic career was seen as attractive enough for young promising researchers to choose and stay within academia and whether they would be motivated to pursue their career in Finland. Hence, some of the supervisors expressed worries about the declining number of Swedish-speaking academics. Supervisor J shared his thoughts as follows:

> The dilemma of the minority group is that the numbers of students being accepted are so small…Well, this year, two (Swedish-speaking) persons who will complete their studies in my field, but…, then there might be a gap for at least three years before another (Swedish-speaking) person will graduate. This means that the number is

really low, and…if you have chosen the wrong person, we are dealing with a catastrophe.

Therefore, the supervisors emphasized the development of high-quality doctoral education and good supervisory practices that will contribute to the attractiveness of becoming a researcher. If doctoral students perceive an academic career as an unattractive alternative, there is a risk that there will not be enough competent specialists to teach and supervise future doctoral students.

Further investigation revealed that supervisors often identified a lack of *individual competence* (23%) as a challenge that hinders the doctoral process. Supervisors highlighted the need for doctoral students to start the writing process immediately and the task of managing many languages in their academic work. Writing is an essential part of the doctoral study process due to the fact that the product, the doctoral dissertation, is in focus. The supervisors emphasized the necessity of writing competence:

> You could say that it is kind of a tender spot in our field that there are many students who are very good when it comes to substance, but they have difficulties with writing. That's the way it is. It is a competency that is not always that strong. There are some exceptions, but generally it is a challenge, and we see doctoral students with very good writing skills less often. (Supervisor B)

In addition, the supervisors explained that the writing of academic texts is often done in a language that is not the mother tongue of the student. The language of the dissertation can be the second, or even the third language of the student. Accordingly, the demands on both the language and writing skills are high. The supervisors also perceived problems with certain aspects of research, such as methodological and domain-specific knowhow. The supervisors perceived that the need to absorb relevant research literature is more demanding nowadays due to internalization and the rapid expansion of research publication. They explained that it gets much tougher to stay on top of the research, to stand out and to be unique in your own research. However, supervisors identified the skills of doctoral students in statistics both as a resource and a challenge in doctoral training:

> It is quite problematic when I have doctoral students who have excellent big data and they don't understand at all how the statistics should be done. They have to depend on an expert, and I think that it is not good. (Supervisor D)

The supervisors described the *scholarly community* (9%) and the *supervisory relationship* (13%) as a challenge less often. When they did, it was in terms of not belonging to a research group, the internalization process, and the risk of loneliness in doctoral studies. Sometimes the supervisors described the challenges for doctoral students in gaining international experience from international research communities and building their own networks. The cause of this, according to the supervisors, was the students' family situation. One supervisor explained the reality for early career researchers who have their own family:

> We have tried to build international co-operation [*sic*] and networks and to support the students, but in the long run those with a family…well, they have children who are at the age when much happens in their personal lives, and they really do not want to leave, not even for a short time. (Supervisor G)

Descriptions regarding the supervisory relationship included a lack of time resources and an unclear division of work. In addition, the supervisors brought up the challenge of dividing work for one doctoral student between many supervisors and the constraints that can occur between a senior and junior supervisor. As one supervisor said:
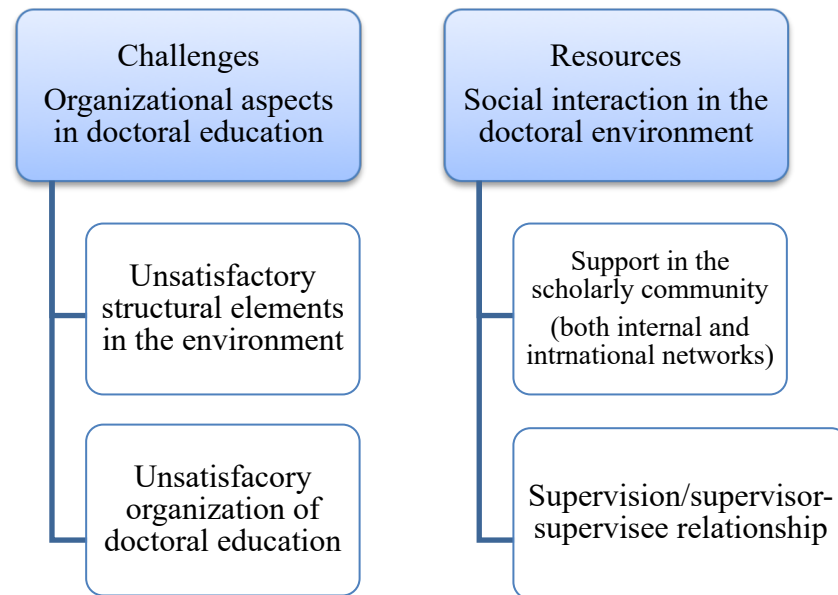
> We are becoming more flexible and see that supervising is a part of the process. You will not suddenly become a good supervisor. You need training. We also have some junior supervisors, but you can see that their world is more black and white. They are not that flexible, and they see faults in the text, and this can be a bit problematic. Through experience I have come to the conclusion that there always has to be a senior supervisor in the process. (Supervisor E)

The core challenges illustrated by the supervisors in this study are associated with aspects at the organizational level and with the need for more fixed structures in doctoral education (such as infrastructure, time resources and funding). In addition, another core challenge was the mismatched organizational needs in doctoral education experienced by the participants. Dissatisfaction with the recruitment procedures, the lack of courses in the study process, and the lack of administrative support were examples of this.

To summarize, the supervisors identified a variety of resources and challenges related to structures, organization of doctoral studies, the scholarly community, the supervisory relationship, and individual competence. The results show that the supervisors perceived slightly more than half of the key regulators in terms of challenges or demands, (55%), and slightly less than half of the key regulators in terms of resources

Figure 2.
Resources and challenges in doctoral education as organizational and social aspects as described in the JD-R model.

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┌─────────────────────────┐     ┌─────────────────────────┐
│      Challenges         │     │       Resources         │
│  Organizational aspects │     │  Social interaction in  │
│   in doctoral education │     │  the doctoral environment│
└─────────────────────────┘     └─────────────────────────┘
        │                               │
        │   ┌──────────────────┐        │   ┌──────────────────┐
        ├───│  Unsatisfactory  │        ├───│   Support in the │
        │   │structural elements│       │   │scholarly community│
        │   │ in the environment│       │   │  (both internal and│
        │   └──────────────────┘        │   │intrnational networks)│
        │                               │   └──────────────────┘
        │   ┌──────────────────┐        │   ┌──────────────────┐
        └───│  Unsatisfacory   │        └───│Supervision/supervisor-│
            │  organization of │            │supervisee relationship│
            │ doctoral education│           └──────────────────┘
            └──────────────────┘
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(45%) in the doctoral process. When it comes to the descriptions of the themes among the factors that promoted the thesis process and the factors that were perceived as obstacles or problems, the results indicate different emphases in the various sub-themes. The scholarly community was most frequently perceived as a resource. The scholarly community was perceived less often as a challenge. Structural matters was defined by the supervisors as the most common challenge in the doctoral process, and with the order reversed, structural matters were seldom identified as a resource.

With reference to the JR-D model, it demonstrates that resources may buffer demands. This means that it is important not to rely only on the sum of the challenges *per se*, but also to consider the quantity and quality of resources available to counteract the effect of those challenges. Further, the results highlight the essentiality of different supervisory resources such as a good supervisor-student relationship, the support of the research team, and international contacts as ingredients of high-quality supervision as resources in the doctoral process. The results also showed that many of the challenges need to be focused on and developed for the whole community rather than for individuals. The results also suggest that challenges that emerge in one domain, for instance in competence may be symptomatic of challenges related to the organization offering the doctoral education. For instance, challenges regarding the importance of excellent writing skills can seldom be solely solved by individual supervisors. In this case, more support in academic writing should be offered to the students at a faculty or institutional level. This challenge at an individual level requires aligned and systematic development work and support by the supervisor, the doctoral program, and the faculty at institutional levels.

The supervisors described structures such as financial insecurity, the burden of bureaucracy because of short-term financing, and a lack of full-time study opportunities as major impediments in the study process. Furthermore, almost a third of the challenges were related to the organization of doctoral education, including doctoral recruitment procedures, changes in doctoral training processes nationally, and the impact of doctoral courses in Swedish. When it comes to the location of the resources perceived by the supervisors, about half of the resources (52%) were associated with the scholarly community and the supervisory relationship, and thus can be described as social aspects in doctoral education. The supervisors typically emphasized the importance of a research group in the thesis process, the support of a team, and international cooperation on the whole. Supervision as a resource was characterized by cooperation with other colleagues and networking options, inspiration that the thesis process offers, and positive emotions that sharing and offering encouragement to the supervisees mean. Figure 2 illustrates the supervisors' descriptions of the resources and challenges at two levels in doctoral education: the social aspects and organizational aspects in doctoral education as described as in the JD-R model.

Discussion

This study mapped key regulators in terms of resources and challenges in the doctoral journey as identified by supervisors. In the context of the JD-R model, there are both challenges and resources in a working environment, and the supervisors reported aspects related to the organizational level as primary challenges. Most of the challenges were connected with the absence of structural forms of support regarding the shortness of time and lack of funding for doctoral students, the experiences of supervisors with the need for more fixed structures in doctoral education, and insufficient opportunities for doctoral students to improve their competency during the doctoral study process.

Moreover, the results showed that the individual competencies of doctoral students were also identified as resources of doctoral success by the supervisors (see also Barnes & Austin, 2009; Jones, 2013). Further, the core resources highlighted by the supervisors were recognized as social aspects in the work environment, meaning that the supervisors underlined the social interaction available and utilized in the doctoral education context. The resources were often related to the scholarly community and the supervisory relationship and were associated with both the form of supervisory support and researcher community support. The supervisors emphasized membership of the researcher community and collaborations as a central resource to cope with the challenges of doctoral studies. This result is in line with earlier research suggesting that both internal and external interaction with other researchers and peers and a cooperative atmosphere are treasured resources (Pyhältö et al., 2012b). The results also corroborate the results of earlier studies showing that more collective supervisory practices offer a broader holistic support network for both the student and the supervisors (Dysthe et al., 2006; Hakkarainen, Hytönen, Makkonen, & Lehtinen, 2016; Stubb, 2012). Recent findings, however, have brought attention to the fact that supervisors do not always recognize the research community as a resource and try to solve many challenges on their own (Vehviläinen & Löfström, 2014), but the supervisors in our study pointed out the importance of support from a larger scholarly community, including interaction with international researcher communities and the relevance of the research group as a core resource.

A greater awareness of the key regulators and their manifestation in the doctoral process can help supervisors to navigate them as resources and challenges. Pinpointing these to different systemic levels in the doctoral education can help to make more efficient use of the resources and to deal with challenges at the appropriate level. In the interpretation of the resources and challenges, it is crucial that they are clarified and explained in the context in which they occur. In one particular context, a perceived resource may perhaps be taken for granted while a resource or challenge in another context may be interpreted quite differently.

The results of our study bring to light the complex structure of doctoral supervision. For the individual supervisor, however, the results of the study indicate the importance of identifying the available resources in order to cope with perceived challenges.

Though the variation of the resources and challenges perceived by supervisors was broad, the perceived key regulators were aligned with regulators identified by the research within the field and located at various systemic levels in doctoral education. There are implications of this result: due to the considerable investment the doctoral student, the supervisor(s), the researcher community, and the institution make in the thesis project, there is a need for augmenting the alignment between the organizational culture and the social structures (Lovitts, 2005). Further, in the light of previous results, it can be shown that a high degree of integration of doctoral students into the research community will increase the likelihood of doctoral degree completion (Cornér et al., 2017; Hermann, Wichmann-Hansen & Jensen 2014; Jairam & Kahl, 2012; Wao & Onwuegbuzie, 2011). It may be important to explain the powerful role the scholarly community can play as a resource in the doctoral process in order to improve the usage of this resource. Understanding how the key regulators operate will allow institutions and their individuals to make the most use of the resources invested while recognizing the implications of challenges in one domain on another domain. This will allow for tackling the challenges to prevent them from transferring from one domain to another.

By collecting data from three institutions we may have avoided some of the problems of single-institution studies in which the results may be a reflection of the institutional context and its specific characteristics rather than the phenomenon at hand. The fact that we were able to identify the same categories in the data from all three institutions suggests that the resources and challenges identified in this study have relevance beyond a single-institutional context (cf. Kvale, 1997). However, the results are not generalizable and were not the intention of this qualitative study. Nevertheless, a survey may provide an indication of the prevalence of the resources identified and challenges in supervision. A limitation of the study is that the categorization in the first phase was done solely by one of the authors. However, once the initial analysis had been done, all authors engaged in the discussion of the categorizations with a focus on ambiguous segments identified by the first author.

In this study the JD-R model allowed us to analyze the supervisors' perceptions of the key regulators in the doctoral study process in terms of challenges and

resources and their localization in the supervisory process. This may be a useful tool for development of doctoral supervision as it allows for analysis of key factors and systemic levels at the same time. Using the JD-R model may be beneficial in bringing forward resources and challenges in other contexts. Hence, the model could also be applied more broadly. To understand how resources and challenges may be similar or different and what the resources and challenges rely upon in various contexts, it is important to provide a detailed description of the particular context.

This study offers a deeper understanding of the PhD context at different systemic levels where linguistic diversity is also a central part of the doctoral journey. Further research is needed on the strategies supervisors use to tackle the perceived challenges. What strategies and actions do supervisors apply in tackling challenges at different systemic levels, and how do those tactics further shape supervision practices in research communities? In this vein, a comparison of local "supervision cultures" would deepen the understanding of the generic and field-specific nature of supervision.

References

Åkerlind, G., & McAlpine, L. (2015). Supervising doctoral students: variation in purpose and pedagogy. *Studies in Higher Education*, *42*(9), 1686–1698. doi:10.1080/03075079.2015.1118031

Bakker, A-B., & Demerouti, E. (2007). The Job Demands-Resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309–328.

Barnes, B. J., & Austin, A. E. (2009). The role of doctoral advisors: A look at advising from the advisors' perspective. *Innovative Higher Education, 33*(5), 297–315.

Cornér, S., & Lindholm, J. (2013). *Doktorandbarometern 2013. (The Doctoral Barometer 2013)*. A survey of Swedish speakers pursuing doctoral studies at the University of Helsinki, The Hanken School of Economics and Åbo Akademi University, their views on their doctoral education and their interest in an academic career. University of Helsinki. Administrative Publications 87.

Cornér, S., Löfström, E., & Pyhältö, K. (2017). The relationships between doctoral students' perceptions of supervision and burnout. *International Journal of Doctoral Studies, 12,* 91–106.

Demerouti, E., Bakker, A., Nachreiner, F., & Schaufeli, W. (2001). The Job Demands – Resources Model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512.

Dysthe, O., Samara, A., & Westrheim, K. (2006). Multivoiced supervision of master's students: A case study of alternative supervision practices in higher education. *Studies in Higher Education*, *31*, 299–318.

Finland's Council of State. (2004). *Regulation of university degrees 645/1997*. Retrieved from http://www.finlex.fi/fi/laki/kaannokset/2004/en200 40794.pdf

Finnish Advisory Board on Research Integrity & Universities Finland UNIFI. (2016). *Supervision of doctoral dissertations and their review process in Finland with an emphasis on assuring research integrity*. Retrieved from http://www.tenk.fi/en

Finnish Board on Research Integrity. (2012). *Responsible conduct of research and procedures for handling allegations of misconduct in Finland. Guidelines of the Finnish Advisory Board on Research Integrity*. Retrieved from http://www.tenk.fi/sites/tenk.fi/files/HTK_ohje_2 012.pdf

Gardner, S. K. (2007). "I heard it through the grapevine". Doctoral student socialization in chemistry and history. *Higher Education*, *54*(5), 723–740.

Gardner, S. K. (2009). Student and faculty attributions of attrition in high and low-completing doctoral programs in the United States. *Higher Education*, *58*(1)*,* 97–112.

Golde, C. M. (2005). The role of the department and discipline in doctoral student attrition: Lessons from four departments. *The Journal of Higher Education, 76*(6), 669–700.

Gurr, G. M. (2001). Negotiating the "rackety bridge" – a dynamic model for aligning supervisory style with research student development. *Higher Education Research & Development*, *20*(1), 81–91.

Hakkarainen, K., Hytönen, K, Makkonen, J., & Lehtinen, E. (2016). Extending collective practice of doctoral education from natural to educational sciences. *Studies in Higher education*, *41*(1), 63–78.

Hasrati, M. (2005). Legitimate peripheral participation and supervising Ph.D. students. *Studies in Higher Education*, *30*(5), 557–570.

Hermann, K. J., Wichmann-Hansen, G., & Jensen, T. K. (2014). *Quality in the PhD process*. Aarhus University. Retrieved from http://www.au.dk/en/quality-in-the-phd-process/reports/

Hlebec, V., Kogovšek, T., & Ferligoj, A. (2011). Influence of social support and personal networks on doctoral students' performance. *Metodolovški zvezki*, *8*, 157–171.

Holyoak, K., & Morrison, R. (2005). *The Cambridge handbook of thinking and reasoning.* New York, NY. Cambridge University Press.

Hunter, K. H., & Devine, K. (2016). Doctoral students' emotional exhaustion and intentions to leave

academia. *International Journal of Doctoral Studies, 11,* 35–61.

Ives, G., & Rowley, G. (2005). Supervisor selection or allocation and continuity of supervision: Ph.D. students' progress and outcomes. *Studies in Higher Education*, *30*(5), 535–555.

Jairam, D., & Kahl, D. H., Jr. (2012). Navigating the doctoral experience: The role of social support in successful degree completion. *International Journal of Doctoral Studies*, *7*, 311–329.

Jones, M. (2013). Issues in doctoral studies – Forty years of journal discussion: Where have we been and where are we going? *International Journal of Doctoral Studies, 8*, 83–104.

Kvale, S. (1997). *Doing interviews*. London, UK: Sage.

Lee, A. (2007). Developing effective supervisors. *South African Journal of Higher Education*, *2*(4), 680–093.

Lee, A. (2008). How are doctoral students supervised? Concepts of doctoral research supervision. *Studies in Higher Education*, *33*(3), 267–281.

Levin–Rosaliz, M. (2004). Searching for the unknowable: A process of detection – Abductive research generated by projective techniques. *International Journal of Qualitative Methods*, *3*(2), 1–18.

Löfström, E., & Pyhältö. K. (2012). The supervisory relationship as an arena for ethical problem solving. *Education Research International.* Retrieved from http://downloads.hindawi.com/journals/edri/2012/961505.pdf

Lovitts, B. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Lanham, MD: Rowman & Littlefield Publishers, Inc.

Lovitts, B. (2005). Being a good course-taker is not enough: A theoretical perspective on the transition to independent research. *Studies in Higher Education*, *30*(2), 137–154.

Marshall, C., & Rossman, G. B. (1995). *Designing qualitative research* (2nd ed.). Thousand Oaks. CA: Sage.

Morgan, D. L. (2007). Paradigms lost and paradigms regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, *1*(1), 48–76.

Pearson, M., & Brew, A. (2002). Research training and supervision development. *Studies in Higher Education, 27*(2), 135–150.

Peltonen, J., Vekkaila, J. E., Haverinen, K., Rautio, P., & Pyhältö, K. (2017). Doctoral students' social support profiles and their relationship to burnout, drop-out intentions and time to candidacy. *International Journal of Doctoral Studies*, *12*,157– 173.

Pyhältö, K., Nummenmaa, A. R, Soini, T., Stubb, J., & Lonka, K. (2012). Research on scholarly communities and development of scholarly identity in Finnish doctoral education. In S. Ahola & D. M. Hoffman (Eds.), *Higher education research in finland. emerging structures and contemporary issues* (pp. 337–357). Jyväskylä University Press.

Pyhältö, K., Stubb, J., & Lonka, K. (2009). Developing scholarly communities as learning environments for doctoral students. *International Journal for Academic Development*, *14*(3), 221–232.

Pyhältö, K., Stubb, J., & Tuomainen, J. (2011). *International evaluation of research and doctoral education at the University of Helsinki – To the top and out to society.* Summary report on doctoral students' and principal investigators' doctoral training experiences. Retrieved from http://wiki.helsinki.fi/display/evaluation2011/Survey+on+doctoral+training

Pyhältö, K., Toom, A., Stubb, J., & Lonka, K. (2012a). Challenges of becoming a scholar. A study of doctoral students' problems and well-being. *ISRN Education.* Retrieved from http://downloads.hindawi.com/archive/2012/934941.pdf

Pyhältö, K., Vekkaila (o.s. Tuomainen), J., & Keskinen, J. (2015). Fit matters in the supervisory relationship: Doctoral students' and supervisors' perceptions about supervisory activities. *Innovations in Education and Teaching International 52*(1), 4–16. doi: 10.1080/14703297.2014.981836

Pyhältö, K., Vekkaila, J., & Keskinen J. (2012b). Exploring the fit between doctoral students' and supervisors' perceptions of resources and challenges vis-à-vis the doctoral journey. *International Journal of Doctoral studies*, *7,* 395–414.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multisample study. *Journal of Organizational Behavior, 25*(3), 293–315.

Seagram, B. C., Gould, J., & Pyke, S. W. (1998). An investigation of gender and other variables on time completion of doctoral degrees. *Research in Higher Education*, *39*(3), 319–335.

Stubb, J. (2012). *"Becoming a scholar. The dynamic interaction between the doctoral student and the scholarly community* (Doctoral dissertation). University of Helsinki, Faculty of Behavioral Sciences, Department of Teacher Education, Research Report 336.

Stubb, J., Pyhältö, K., & Lonka, K. (2011). Balancing between inspiration and exhaustion: PhD students' experienced socio-psychological well-being. *Studies in Continuing Education*, *33*(1), 33–50.

Stubb, J., Pyhältö, K., & Lonka, K. (2012). The experienced meaning of working with a PhD thesis. *Scandinavian Journal of Educational Research, 56*(4), 439–456.

Vehviläinen, S., & Löfström, E. (2014). "I wish I had a crystal ball": Discourses and potentials for developing academic supervising. *Studies in Higher Education*, *41*(3), 508–524.

Vekkaila, J. (2014). *"Doctoral student engagement. The dynamic interplay between students and scholarly communities"*(Doctoral dissertation). University of Helsinki, Faculty of Behavioural sciences, Department of Teacher Education, Research report 350.

Vekkaila, J., Virtanen, V., Taina, J., & Pyhältö, K. (2016). The function of social support in engaging and disengaging experiences among post PhD researchers in STEM disciplines. *Studies in Higher Education*, *39*, 1–16. doi:10.1080/03075079.2016.1259307

Wao, H. O., & Onwuegbuzie, A. J. (2011). A mixed research investigation of factors related to time to the doctorate in education. *International Journal of Doctoral Studies*, *6*, 115 –134.

Wisker, G. (2005). *The good supervisor*. Basingstoke, UK: Macmillan.

Zhao, C-M, Golde, C. M., & McCormick, A. C. (2007). More than a signature. How advisor choice and advisor behavior affect doctoral student satisfaction. *Journal of Further and Higher Education*, *31*(3), 263–281. doi:10.1080/03098770701424983

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SOLVEIG CORNÉR**,** M.A. (Educ.) is a Ph.D. student in the Doctoral Program in Psychology, Learning and Communication, University of Helsinki. Her area of expertise involves social support for early career researchers' in higher education institutions, well-being (https://researchondoctoraleducation.wordpress.com) and youths' identities. Her special interest lies within international comparison. She has substantial experience in auditing and accreditation of quality assurance of higher education institutions in Finland, Norway, and Denmark.

KIRSI PYHÄLTÖ is a Professor of Educational Sciences in the Faculty of Educational Sciences, University of Oulu, and Research Director in the Centre for University Teaching and Learning at the University of Helsinki. She is an expert in the area of researcher education and careers. Her research interests include doctoral education, supervision, researcher communities, and post-doctoral careers https://researchondoctoraleducation.wordpress.com.

ERIKA LÖFSTRÖM is a Professor of Education at the Faculty of Educational Sciences, University of Helsinki. She is an expert on research ethics and integrity, and her research interests include teaching and learning research ethics and academic integrity, as well as teacher identity development.

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