

Doctoral students' writing profiles and their relations to well-being and perceptions of the academic environment

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Abstract

We explored doctoral students' writing profiles using a person-centred approach. We also studied differences between profiles in terms of experienced well-being and perceptions of the learning environment. The participants of our study ($n = 664$) were PhD students from three faculties at the University of Helsinki, Finland. The *Writing Process Questionnaire* (Lonka et al., 2014) was used to measure writing conceptions and problematic writing. Well-being was measured by *MED NORD*, adapted to the doctoral context (Lonka et al., 2008; Stubb, Pyhältö & Lonka, 2011) and *Perceptions of the learning environment*, using specific items from Dahlin et al. (2005). PhD students with similar patterns of writing variables were identified through latent profile analysis (LPA). We conducted one-way ANOVAs to examine group differences with respect to well-being and perceptions of learning environment. We identified three writing profiles: *Growth-Transforming* (51%), *Ambivalent* (40%), and *Fixed-Blocking* (9%) groups. The *Fixed-Blocking* group reported a lack of interest the most often and also reported receiving the least feedback. The *Growth-Transforming* group was the most and the *Fixed-Blocking* group the least satisfied with their studies. It appeared that epistemic beliefs related to research writing were most decisive in differentiation among PhD students. Blocks were related to beliefs in innate ability. We concluded that although problems in writing are quite common, epistemic beliefs may be even more decisive in terms of successful research writing.

Introduction

Research writing is one of the central components of doctoral studies. Doctoral students' conceptions of writing are likely to contribute to how they approach their thesis writing, explanations given for success and failure, their commitment to developing their academic literacy skills, and their actual writing practices (Lonka et al., 2014). Research writing can be described as a process of knowledge transformation, in which the doctoral student engages in effortful, reflective and dialectic processes of using writing, in order to create and develop knowledge (Bereiter and Scardamalia, 1987). Skilled writers employ sophisticated cognitive activities, such as building a deep-level mental representation of the task, engaging in active and reflective problem-solving, reflecting and relating to the nature of the task, and taking the anticipated audience into consideration (e.g., Hildyard, 1996; Neely, 2014).

Research writing has both domain-specific and generic aspects. The general set of expert competencies and academic skills connected with literacy may be described as *literate expertise* (Scardamalia and Bereiter, 1991). However, as research writing ideas and their conventions are often socially shared in scholarly communities (Aitchison & Lee, 2006; Can & Walker, 2011), there may be disciplinary variance in how doctoral students see their own domain. In the present paper, however, we look at three different faculties and common factors across disciplines only.

Research writing also involves complex transformation of knowledge into written form (Bereiter & Scardamalia, 1987). This is a very special form of ill-defined problem-solving, as it tends to become increasingly *difficult* as expertise develops. A novice may think that writing is simply the recording of what one already knows (knowledge-telling or surface writing), whereas experts have learned that it calls for effortful reflective work (knowledge transforming or deep writing). Thus it follows that research writing has no straightforward formula of success: elaborative, intuitive and flexible ways appear to be more successful than factual, structural and rigid ones (Lavelle & Bushrow, 2007). Research writing is difficult, as it calls for tolerating a great deal of ambiguity and transforming drafts into complex research papers by revising and creating new meanings. Attributions and beliefs in fast success and innate abilities may therefore become increasingly harmful towards the end of the doctoral journey, especially if one wants to publish one's work (Dweck & Elliot, 1983; Dweck, 2006).

Successful academic writing is never simple in any field, and calls for acknowledging multiple perspectives and audiences (Neely, 2014). Deep-level writing involves elaboration and intuitive thinking, whereas college students often try to survive with spontaneous and impulsive surface-level strategies (Lavelle & Bushrow, 2007). At school, students often rely on experts and are used to their answers being correct (Bråten, Stromso, & Samuelstuen, 2008). In research writing, however, they need to develop resilience to create new ideas and transform their previous epistemic beliefs. Epistemic beliefs in elementary science may be quite fact-oriented, and research writing calls for a transition from presenting what other people have discovered into making one's own discoveries and reporting them to a critical audience in trustworthy and eloquent ways (Bereiter & Scardamalia, 1987; Lovitts, 2008). Doctoral students' research writing calls for seeing writing as a creative act, and a willingness to revise texts according to feedback, either face-to-face or on line (Can & Walker, 2011; Guasch, Espasa, Alvarez, & Kirschner, 2013).

When struggling with the unknown and trying to develop not only one's own thinking but also literate expertise, one needs to entertain adaptive ideas of writing (Boice, 1990; 1993). Beliefs regarding the reasons for success and failure, i.e. *attributions*, have an impact on our efforts (Weiner, 1986). If doctoral students attribute their productivity in writing to innate abilities, and all their problems to external factors, they leave little room for effort in the case of failure (Dweck, 2006). Perceiving writing as an innate gift may lead to a situation in which, when facing problems, doctoral students start avoiding writing instead of writing more (Boice, 1993). Sometimes they may simply stop trying and put their academic careers at risk. Therefore, in the present paper, we focus on *how* doctoral students see their process of writing rather than on their traits (i.e., personality).

Problems in writing may have consequences for successful research. Although they are multidimensional in nature, they can be measured reliably (Lonka et al., 2014). Perfectionism, procrastination, low sense of productivity, and even writing blocks are common among PhD students, and all these writing problems have shown to correlate with each other in Spanish and Finnish contexts (Cerrato Lara, 2014; Lonka et al., 2014). Problems in writing tend to intertwine and result in a vicious circle, sometimes even leading to a total writers' block (Boice, 1993).

Epistemic beliefs and ideas regarding writing are related, as ideas of knowledge often relate to ideas of the origin and authority of written texts (Neely, 2014). Collaborative creation of knowledge and research articles is typical of successful research groups (Hakkarainen, Hytönen, Makkonen, Seitamaa-Hakkarainen, & White, 2013), and the epistemic beliefs of researchers may either foster or hinder well-being and creativity in research teams. It is important that the epistemic

aims of the faculty support deep approaches to writing. There are also many advantages to doctoral students co-authoring with their supervisors. It is important the students feel integrated and valued members of the community, and that they receive suggestive and constructive feedback (Can & Walker, 2011).

Doctoral student subjective well-being

Prior research on doctoral experience has shown that doctoral students experience negative emotions, a lack of interest, and a significant amount of distress during their studies (Brauer et al., 2003; Hyun. Quinn, Madon & Lustig 2006; Kurtz-Costes, Helmke, & Ülkü-Steiner, 2006; Stubb, Pyhältö & Lonka, 2011). High levels of such experiences have shown to be related to disengagement, prolonged studies and drop-out among doctoral students (Golde, 2000, 2005; Lovitts, 2001; Stubb, et al. 2011).

There is also some evidence of an interrelation between doctoral students' writing conceptions and their experienced well-being (Blunt & Pychyl, 2000; Chu & Choi, 2005; Schraw et al., 2007). In a small-scale study, Cotterall (2013) demonstrated how writing triggered negative emotions, anxiety and frustration in doctoral students. Further, Lonka et al. (2014) found in a variable-oriented study that students who suffered from writing block, procrastination and perfectionism also expressed more stress, exhaustion, anxiety, and lack of interest (or meaning), and that these variables were related to lower levels of experienced productivity. In contrast, the students who reported high productivity and viewed writing as knowledge transformation found their doctoral journey the most meaningful. These findings were also confirmed by Cerrato Lara(2014), although she also found that exhaustion did not correlate with sense of productivity in the Spanish population, which is likely due to high degrees of exhaustion in this population in general.

An interrelation between anxiety and procrastination has also been detected (Schraw et al., 2007; Van Eerde, 2003; Fritzsche et al., 2003; Spada et al., 2006, Alexander & Onwuegbuzie, 2007). Moreover, Cerrato Lara (2014) showed that Spanish doctoral students who had adopted the most maladaptive writing profiles suffered most from exhaustion, anxiety and stress, as well as a lack of interest in their studies, compared to students with more adaptive writing profiles.

Doctoral student – learning environment fit

The researcher community provides the primary learning environment (Kamler & Thomson, 2008; McAlpine & Norton, 2006; Pyhältö, Stubb & Lonka, 2009) for not only academic writing and constructing one's identity as writer, but also for well-being (Stubb, Pyhältö & Lonka 2011). The researcher community is a complex learning environment, consisting of multiple communities of varying degrees of formality (Lahenius, 2012; Shacham & Od-Cohen, 2009; Wisker, Robinson, & Shacham, 2007), such as research and seminar groups, reading groups and faculties. These research communities, in which students work and interact on a daily basis, form the microenvironment, which significantly contributes to their degree completion and creative performance (Lovitts, 2005).

The complexity of these dynamics can be seen in the general framework of person-environment fit model (see Holland, 1985). Studies of the doctoral experience imply that the perceived fit or misfit – meaning the congruence, or lack of it, between doctoral students and their work environments – influences students' doctoral experiences and the completion of their degree process (Pyhältö, Vekkaila, & Keskinen 2015). For instance, Golde (2005) showed that doctoral students who discontinued their studies reported several experienced mismatches between their goals and expectations and the norms and practices of the discipline, department and supervisor as central reasons for attrition. Some evidence also indicates that doctoral students who perceive a fit between themselves and the scholarly community have higher levels of received feedback than their counterparts (Pyhältö et al. 2009).

We assumed that PhD students' writing profiles would partially colour their perception of their research community, especially in terms of their ideas regarding feedback. Lavelle and Bushrow (2007) suggested that the beliefs writers hold about writing direct the strategies they employ and therefore affect their academic outcomes. There may, however, be a misfit between students' beliefs and their community. For instance, PhD candidates who report maladaptive conceptions of writing (procrastination, perfectionism or blocking), or who entertain epistemic beliefs that do not foster effortful writing and productivity, may also experience some kind of misfit between themselves and their academic environment. They may be 'good course-takers' or novice-like writers, who find it hard to become independent scholars (Lovitts, 2005) or who have low self-efficacy in academic writing (Lavelle & Bushrow, 2007). Students who value knowledge transformation (and apply a deep approach to writing) may also experience feedback as more useful. Furthermore, problems in writing may also manifest themselves as problems in well-being and satisfaction. We expected to find profiles of deep writers, willing to transform their texts and

themselves as writers on the one hand, and profiles of those who avoid the demanding writing process, have a strong belief in innate ability and remain low in productivity on the other. The latter profile could possibly even manifest itself as classic writer's block.

Aims

The present study focuses on the conceptions of writing from the perspective of problems in writing and epistemic beliefs. Our aim was to identify PhD students' personal profiles, which reflect their conceptions of themselves as writers. Previously, our measures were used to identify individual writing profiles in workshop settings (Lonka, 2003), or during individual appointments with study psychologists. In these contexts, the questionnaire was used as a self-reflection tool, the focus of which was to help MA/PhD students revise the maladaptive beliefs and practices that possibly hindered their academic success. The first author read their diaries and reflections on their writing profiles over time and noticed that the doctoral students' interpretations of their own personal writing profile provided them with helpful insights. As such interventions appeared beneficial, we began large-scale measurements to see whether we could generalise our findings.

On the basis of our previous variable-centred quantitative research (Lonka et al., 2014), we assumed that conceptions of writing were linked to well-being and the progress of PhD studies. Our main aim was to combine different conceptions of writing (i.e. blocks, procrastination, perfectionism, innate ability, knowledge transformation, and productivity) and to employ a person-centred approach in our investigation of varying writing profiles. We believed that the profiles would help us identify potentially harmful approaches to writing, and that we could then use this information to develop practices that would optimally support PhD students' research writing.

Possible misfits between epistemic aims and the demands of research writing might manifest as problems in the writing process. On the basis of previous research, we assumed that knowledge transformation (or deep writing), including readiness to revise and make use of feedback, would be a useful epistemic aim in terms of productivity, well-being and satisfaction (Can & Walker, 2011; Lavel & Bushrow, 2007; Lonka et al., 2014). We therefore examined the differences between the profiles in terms of experienced well-being and perceptions of the learning environment. The specific research questions were:

- (1) What kind of writing profiles can be identified among doctoral candidates in terms of epistemic beliefs and problems in writing?

(2) How do doctoral candidates with different writing profiles differ in terms of

a) experienced well-being (i.e. stress, exhaustion, anxiety, and lack of interest/meaning)?

b) their perceptions of the learning environment (i.e. feedback, workload, satisfaction, poor ambience, and worry)?

Finnish doctoral education in medicine, arts and the behavioural sciences

Finnish doctoral studies are deeply embedded in conducting thesis research. In addition to the thesis, a doctoral degree involves a dissertation, course work based on personal study plans, seminars, and a public defence of the dissertation (Pyhältö, Stubb & Tuomainen, 2011). The general target duration of full-time studies for a doctorate is four years. Research work is given much greater emphasis than course work. The student typically has one or two supervisors, and sometimes also a supervisory board consisting of members from outside the university (Pyhältö, Stubb & Tuomainen, 2011). Doctoral education in Finland has been described in general by Dill et al.(2006).

The present study was carried out in the major research university of Finland, listed among the 100 best universities in the world, according to the QS World University Rankings 2018 or Times Higher Education (THE) 2018. It has no institutional review boards.

Methods

Participants and Procedure

The study included data collected from three faculties at the University of Helsinki: arts, medicine, and educational sciences (formerly behavioural sciences). Altogether 669 (female: 496; male: 168; mean age: 39; Med: 35) doctoral candidates responded to the survey after receiving it at their home addresses by post. We collected the students' contact information from the student register database. The total response rate was 38.4%. Despite this somewhat low response rate, we believe that the sample sufficiently represented the whole doctoral student population at the faculties in terms of gender and age distribution. Of these participants, 664 responded to the *Writing Process Questionnaire* and were included in the analysis. The participants were at different phases of their doctoral studies, and all had either MAs or licentiate degrees. Half of the students reported working full-time and the other half part-time on their thesis.

Measurements

The *Writing Process Questionnaire* had been used among undergraduate students (in Finnish) since 1996, was modified for PhD students by Lonka (2003), and was first used on a large scale by Pyhältö, Stubb and Lonka (2009). It was based on the work of Boice (1990; 1993) who studied problems in writing, as well as Bereiter and Scardamalia (1987) who examined the typical features of expert writing. Previously, the main function of this tool had been to help undergraduate and PhD students reflect on their writing process, and to analyse the problems in their own writing. Usually, they were first asked to test their approaches to writing by using this instrument (they could identify their own individual profile based on it), and then to write a brief reflection based on their profile.

The *Writing Process Questionnaire* (Lonka et al., 2014; see <https://doi.org/10.17239/jowr-2014.05.03.1>) consisted of six sub-scales for measuring blocks (five items, $\alpha = .60$, e.g. '*I sometimes get completely stuck if I have to produce texts*'), knowledge transformation (six items, $\alpha = .63$, e.g. '*Writing develops thinking*' or '*Rewriting texts several times is quite natural*'), productivity (four items, $\alpha = .76$, e.g. '*I am a regular and productive writer*'), procrastination (four items, $\alpha = .81$, e.g. '*I often postpone writing tasks until the last moment*'), perfectionism (four items, $\alpha = .67$, e.g. '*I could revise my texts endlessly*'), and innate ability (two items, $\alpha = .57$, e.g. '*Writing is a skill that cannot be taught*'). The validity and reliability of this questionnaire was tested using confirmatory factor analysis with the same sample (Lonka et al., 2014). It was further tested among Spanish and Mexican doctoral student populations (Cerrato Lara et al., 2017).

We measured *experienced well-being* using the *MED NORD* questionnaire, modified for the context of doctoral studies (Lonka et al., 2008; Stubb, Pyhältö & Lonka, 2011, 2012). Altogether 10 items measured experienced well-being, that is, experienced stress (One-item stress scale by Elo et al., 2003), exhaustion (four items, $\alpha = .82$, e.g. '*I feel exhausted*', modified according to Maslach & Jackson, 1981), anxiety (three items, $\alpha = .65$, e.g. '*I often fear I will fail in my doctoral studies*'), and lack of interest (two items, $\alpha = .76$, e.g. '*It is difficult for me to find meaning in my doctoral studies*').

We measured the doctoral students' perceptions of the learning environment (Dahlin et al. 2005) using 13 Likert scale items, including feedback (three items, $\alpha = .76$, e.g. '*I often receive constructive feedback on my knowledge and skills*'), workload (two items, $\alpha = .59$, e.g. '*The pace of*

doctoral studies is too fast), satisfaction (three items, $\alpha = .51$, e.g. *I find my career choice satisfying*), poor ambience (three items, $\alpha = .66$, e.g. *Doctoral education promotes a cold and impersonal attitude*), and worry (two items, $\alpha = .50$, e.g. *I am worried about my professional career*). All the items were rated on a five-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). On the single item stress scale, '1' meant 'Not at all' and '5' meant 'Very much'.

The reliability of the scales, based on the present data, appeared satisfactory or good in terms of internal consistency, ranging from .60 to .81 on the Writing Process scales, from .65 to .82 on the Experienced Well-being scales, and from .50 to .76 on the Perceptions of the Learning Environment scales. Since the questionnaire is not a psychological test, Cronbach's alphas may be regarded as reflecting acceptable construct reliability. However, many scales were very brief, which usually leads to lower reliability (Richardson, 2004).

Lonka et al. (2014) have presented correlations and descriptive statistics (i.e., raw means and standard deviations). In their validation paper, the correlational results supported convergent and discriminant validity; the correlations within the scales were in agreement with the expectations, and in line with previous studies.

Data analyses

The present study used a person-centred approach to investigating what kinds of writing profiles exist and how large a proportion of students have a particular profile. The goal of the person-centred approach is to group individuals into categories, each one of which contains individuals who are similar to each other and different from individuals in other categories (Muthén & Muthén, 2000). Doctoral candidates with similar patterns of writing variables were identified through latent profile analysis (LPA). LPA is a probabilistic or model-based variant of traditional cluster analysis (Vermunt & Magidson, 2002), and seeks to identify the smallest number of latent classes (groups) that adequately describe the associations among observed continuous variables.

We carried out a series of LPAs using the mean scores of the scales. In the analyses, we added classes stepwise until the model optimally fit the data. We used the Bayesian Information Criterion (BIC), the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR), and the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) as the statistical criteria for choosing the best-fitting model. The model with the minimum information criterion value was considered the model of

choice. The Vuong-Lo-Mendell-Rubin and the Lo-Mendell-Rubin likelihood ratio tests also provided a standard of comparison for ascertaining the preferred number of classes in the model (Lo, Mendell & Rubin, 2001). The p value provided by the test indicated the probability that the H_0 model, the model with one less class, was tenable. A resulting p value less than .05 indicated that the estimated model was preferable over the reduced model. Furthermore, the classification quality (i.e., entropy value) and the usefulness and interpretativeness of the latent classes (e.g., the number of individuals in each class), were also considered criteria for choosing the best fitting model. In the LPA models, the variables with the strongest correlations (based on Lonka et al., 2014) were allowed to correlate within latent groups (i.e. blocks with procrastination, perfectionism, and productivity; and procrastination with perfectionism and productivity). Further, variances and covariances were assumed to be equal across classes.

After establishing their writing profiles, each participant was given a class membership based on the posterior probabilities of the LPA. After this, we conducted ANOVAs and pairwise comparisons on the grouping variables to further investigate the differences between profiles and the effects of single variables on differentiating the profiles. Finally, we conducted one-way ANOVAs with pairwise comparisons in order to examine group differences with respect to the well-being and learning environment variables. The LPA method was implemented using the Mplus statistical package (Version 5.2; Muthén & Muthén, 1998-2010), and the ANOVAs and pairwise comparisons using IBM SPSS Statistics 22.0.

Results

Writing profiles

The results from a series of LPAs (see Table 2 for fit indices) showed that BIC decreased when additional latent classes were added to the three-class solution. The VLMR and LMR tests also provided clear support for this solution. In addition, the average individual posterior probabilities for being assigned to a specific latent class were .92, .91, and .94. The entropy value was .83, which also indicated that the three-class model clearly differentiated the latent groups. Furthermore, the usefulness and interpretativeness of the latent classes (e.g., the number of individuals in each class), as well as the reasonableness of the solutions in relation to theory and previous research, were also considered criteria for choosing the three-class model. The three groups were labelled according to the score mean profiles, as: (1) the *Growth-transforming Profile* ($N = 338, 51\%$) (2) the

Ambivalent Profile ($N = 266$, 40%) and (3) the *Fixed-blocking Profile* ($N = 60$, 9%) (see Table 3).

Table 1
Information criteria values for different class solutions

Number of classes	BIC	p_{VLMR}	p_{LMR}	Entropy	Group sizes
1	8432.372	-	-	-	664
2	8360.479	0.0000	0.0000	.76	565, 99
3	8319.020	0.0001	0.0002	.83	60, 266, 338
4	8327.207	0.0785	0.0830	.73	60, 200, 130, 274
5	8340.813	0.7926	0.7972	.75	273, 60, 181, 138, 12

Note. BIC = Bayesian Information Criterion; p_{VLMR} = Vuong-Lo-Mendell-Rubin likelihood ratio test; p_{LMR} = Lo-Mendell-Rubin adjusted likelihood ratio test.

Table 2 shows that the *Growth-transforming Profile* ($N = 338$, 51%) represented a typical doctoral candidate in the sample with the highest perfectionism, knowledge transformation, and productivity, and the least blocks and belief in innate ability. The *Fixed-blocking Profile* ($N = 60$, 9%) expressed the opposite: students with this profile had the lowest scores in knowledge transformation and productivity, and the highest in blocks and belief in innate ability. The *Ambivalent Profile* ($N = 266$, 40%) remained in between the other two: the students with this profile expressed less perfectionism, knowledge transformation, and productivity; and had higher scores in blocks and belief in innate ability than the those with the *Growth-transforming Profile*. However, they also reported more knowledge transformation and less blocks than those with the *Fixed-blocking Profile*.

Knowledge transformation was clearly the variable that differentiated the profiles the most and its effect size on the cluster solution was very strong ($\eta^2 = .85$). As regards blocks, perfectionism, innate ability, and productivity, the differences between the profiling variables were not as decisive, although we did find some statistically significant pairwise differences. Finally, procrastination did not differentiate the profiles. In line with the correlational results (Lonka, 2014), productivity and knowledge transformation were also positively related to each other within the profiles, and negatively related to blocks and innate ability. Thus, the more adaptive the ideas, the fewer problems in writing, and vice versa. In contrast to the correlational results, perfectionism was related to higher productivity and fewer blocks within the profiles (*Growth-transforming Profile*).

Table 2
Mean differences between the profiles' grouping variables

Variable	Growth-Transforming		Ambivalent		Fixed-Blocking		$F(2, 661)$	p	η^2
	$N = 338$		$N = 266$		$N = 60$				
	M	SD	M	SD	M	SD			
Blocks	2.17	.65	2.32	.66	2.55	.73	10.08	.000	.03
Procrastination ¹	2.75 _a	.99	2.80 _a	.90	2.75 _a	.93	0.23	.797	.00
Perfectionism	2.79 _a	.79	2.60 _b	.78	2.58 _{ab}	.69	5.35	.005	.02
Innate Ability	1.82	.84	2.15 _a	.90	2.23 _a	.77	13.50	.000	.04
Knowledge Transf. ¹	4.78	.18	4.18	.18	3.41	.23	1816.3	.000	.85
Productivity ¹	2.84	.91	2.64 _a	.72	2.51 _a	.81	6.99	.001	.02

Note. Means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Bonferroni correction, ¹ with Games-Howell correction)

Differences between the profiles in terms of experienced well-being

In order to investigate how the writing profiles (i.e., group memberships) predicted experienced well-being, we examined how doctoral candidates with divergent profiles differed with respect to their experienced stress, exhaustion, anxiety, and lack of interest. The effects and the mean differences are summarised in Table 3. The results revealed that lack of interest varied significantly as a writing profile function. The pairwise comparisons revealed that the participants with the *Fixed-blocking Profile* experienced more lack of interest than the participants with the *Growth-transforming* or the *Ambivalent Profile*. We found no statistically significant differences between the other well-being variables of the profiles.

Table 3
Mean differences between the writing profiles in terms of experienced well-being

Variables	Growth-Transforming		Ambivalent		Fixed-Blocking		$F(2, 661)$	p	η^2
	M	SD	M	SD	M	SD			
Stress	2.74 _a	1.16	2.75 _a	1.15	2.97 _a	1.25	.996	.370	.00
Exhaustion	2.68 _a	.94	2.74 _a	.89	2.85 _a	.97	.874	.418	.00
Anxiety ¹	2.73 _a	.96	2.61 _a	.92	2.76 _a	1.13	1.264	.283	.00
Lack of Interest ¹	1.99 _a	1.07	2.12 _a	.96	2.69	1.24	11.726	.000	.03

Note. Means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Bonferroni correction, ¹ with Games-Howell correction)

Differences between the profiles in terms of perceptions of learning environment

In order to investigate how the writing profiles (i.e., group memberships) predicted perceptions of the learning environment, we examined how doctoral candidates with divergent profiles differed in terms of feedback, workload, satisfaction, poor ambience, and worry (Table 4). Feedback and satisfaction differed significantly as a writing profile function. The pairwise comparisons revealed that the participants with the *Fixed-blocking Profile* felt that they received less supportive feedback than the participants with the *Growth-transforming* or *Ambivalent Profile*. Further, doctoral candidates with the *Growth-transforming Profile* were the most satisfied, and those with the *Fixed-blocking Profile* the least satisfied with their studies. We found no statistically significant differences between the profiles' other learning environment variables.

Table 4

Mean differences between writing profiles in terms of perceptions of learning environment

Variable	Growth-Transforming		Ambivalent		Fixed-Blocking		<i>F</i> (2, 661)	<i>p</i>	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Feedback	3.36 _a	.95	3.18 _{ab}	.93	2.97 _b	.99	5.704	.003	.02
Workload ¹	2.39 _a	.83	2.36 _a	.73	2.34 _a	.87	.142	.867	.00
Satisfaction	3.86	.69	3.67	.66	3.28	.78	20.042	.000	.06
Poor ambience	2.42 _a	.88	2.43 _a	.79	2.66 _a	.76	2.233	.108	.01
Worry	2.88 _a	1.13	2.90 _a	1.11	2.95 _a	1.05	.109	.896	.00

Note. Means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Bonferroni correction, ¹ with Games-Howell correction)

Discussion

Knowledge transformation was clearly the variable that differentiated the three profiles the most, indicating that it makes a strong contribution to the results. Concerning blocks, perfectionism, innate ability, and productivity, the differences between the profiles were not as decisive, although we did find statistically significant pairwise differences. The construct of knowledge transformation theoretically binds together the epistemic and practical aspects of research writing. From the epistemic point of view, trying to formulate and justify one's research is the key element

of academic work (Bråten, Stromso, & Samuelstuen, 2008). It also reflects adopting a more constructivist epistemology (Hofer, 2016).

Cross-cultural variation in how doctoral students perceive knowledge transformation and literate expertise also occurs. Lonka et al. (2014) showed that seeing writing as knowledge transformation had two dimensions among Finnish doctoral students. First, they saw writing as a creative act and second, they believed that the writer should modify a piece of work by making use of feedback and keeping in mind how the reader will understand the text. Later, Cerrato Lara et al. (2017) showed that among Spanish and Mexican doctoral students, only the former part of the conception could be measured. For these Hispanic populations, the *Knowledge transformation* scale was shortened and renamed *Knowledge creation*. The rhetoric aspect of literate expertise did not emerge in this population, since neither the awareness of audience nor the seeking of constructive feedback (Neely, 2014) arose through the *Writing Process Questionnaire*. It is possible that the difference between the Hispanic and Finnish population is due to the fact that in Finland it is much more common for a doctoral dissertation to be a summary of already published articles (Swedish National Agency for Higher Education, 2006) by the time the data have been collected. Trying to publish forces a person to transform their own work and take the target audience seriously, simply due to the peer review process.

The students with the *Growth-transforming Profile* were the most satisfied with their doctoral studies, and also felt that they received feedback the most often. This may be due to their more open sense of themselves as writers (Neely, 2014) or that they were most able to make use of feedback and recognise it as useful. They may also have the most experience in receiving such feedback. This profile was negatively related to writers' block, which was in line with our prior findings in Lonka et al., (2014) and with those of Cerrato Lara (2014). Interestingly, the doctoral students in this profile reported the most perfectionism. This may be due to their willingness to develop their texts further. Seeing writing as a creative act involving complex problem solving and several rounds of rewriting may help doctoral students surpass the most difficult challenges of academic writing, as well as the setting of high criteria for writing. The fact that productivity was the highest in this group suggests that this kind of approach to writing is useful. The majority of the participants had this profile (51%).

Knowledge transformation was negatively related to the other epistemic conception of writing: the belief of innate ability also differentiated the profiles. Innate ability was the signature variable of doctoral students with the *Fixed-blocking Profile*, and formed the minority (9%). *Fixed-*

blocking Profile students were the least satisfied with their studies, most often experienced writers' block and lack of interest in the contents of their studies, and reported receiving feedback the least often. This profile may reflect a fixed mindset (Dweck, 2006) among doctoral students who strongly believe that writing is an innate ability. Since beliefs in the researcher community are socially shared, this may also reflect the culture of their scholarly community rather than merely their individual beliefs (Kamler & Thomson, 2008).

It was somewhat surprising that *procrastination*, i.e. postponing or failing to start writing, (Steel, 2007) did not differentiate the profiles. Previous literature indicates that procrastination is very common among researchers (Boice, 1993), especially in writing assignments (Klassen et al., 2009), since research writing is a complex and demanding form of ill-defined problem solving, and seldom offers short-term rewards (Boice, 1990; Lonka et al., 2014). Doctoral students in all profiles reported equal, rather modest levels of procrastination. This is in line with a literature review that considered that procrastination can be either adaptive or maladaptive in nature (Chu & Choi 2005; Klassen et al., 2008; Kearns et al., 2008; Schraw et al., 2007; Knaus 2000; Spada et al., 2006). Healthy procrastinators may aim to improve time management by very focused last-minute efforts that lead to intensive experiences of engagement, even flow. Our instrument did not allow differentiation among these two types of procrastination.

As regards well-being, lack of interest was the only variable that differed significantly as a function of the writing profiles. Pairwise comparisons showed that the participants with the *Fixed-blocking profile* experienced a greater lack of interest than the participants with the *Growth-transforming* or *Ambivalent profiles*. We found no statistically significant differences between the profiles' other well-being variables. This is not surprising, as previous studies show that doctoral studies often lead to some level of negative emotions, anxiety and stress (Cotterall, 2013; Golde, 2005; Hyun et al. 2006; Kurtz-Costes et al., 2006; Lovitts, 2001). However, a remarkable lack of interest can be more critical for the completion of PhD studies. In order to flourish in doctoral studies, it is important to experience the work as meaningful, and to be committed.

Therefore, it is not surprising that lack of interest played such a substantial role in academic writing among Finnish doctoral students. Doctoral students who cannot see meaning in their PhD project or who are not interested in their topic find it difficult to complete their degree. Stubb, Pyhältö & Lonka (2012) showed that seeing one's thesis work as a process of learning and development was positively related to both well-being and study persistence. In contrast, doctoral candidates who mainly focused on obtaining a degree paradoxically ended up prolonging their

studies. Completing a PhD journey thus appears to be a demanding process that calls for a passion for the topic itself. Stubb, Pyhalto and Lonka (2011) showed that doctoral students who reported process-related meaning in their work experienced less stress, exhaustion and anxiety than those who mainly aimed for a final product.

In general, doctoral candidates with the *Growth-transforming profile* were the most satisfied, and those with the *Fixed-blocking profile* the least satisfied with their studies. In all profiles, the participants reported a heavy workload, worry, and poor ambiance. As pointed out above, the PhD process is demanding in many ways, and stress, worry and hard work are often inevitable. However, the conceptions of writing seem to be relevant in terms of a meaningful doctoral process, especially the questions related to epistemic beliefs.

Methodological reflections

In the present study, the person-oriented approach provided interesting results, which were somewhat different to those of previous variable-oriented studies. It was especially interesting that the epistemic view of knowledge transformation was so important in terms of successful academic writing. We did not, however, measure general epistemic beliefs, which in Neely's (2014) study did not correlate significantly with aspects of students' rhetorical writing. Other studies have in turn shown that epistemic beliefs have a bearing on the quality of writing (Mason & Boscolo, 2004). The *Writing Process Questionnaire* used in our present study was specifically designed to examine the conceptions of writing, and the contextual measure may even capture the epistemic dimensions of academic writing better than general measures.

We only examined a Finnish population in our study, but we similar patterns have been found in writing profiles in a Spanish population: Cerrato Lara (2014) found parallel results among doctoral students: some simultaneously reported the highest scores for both knowledge creation and productivity, whereas others simultaneously reported the highest scores for both blocks and innate ability. In relation to well-being, the results were quite different in Cerrato Lara's study; differences were significant not only in lack of interest, but also in the other well-being variables. This variability mainly reflects the large doses of ill-being among the Spanish sample. This could be a result of their research climate, which promotes high competitiveness and hierarchical differences according to Hofstede's cultural dimensions theory (see Hofstede, Hofstede, & Minkov, 2010). This may affect students' conceptions of research and writing (Cerrato Lara et al., 2017). The Anglo-

American context is somewhat different, and we are currently collecting data from the UK to see whether these measures could also be applied there.

Although our response rate was somewhat low, we believe that it covered most of the active doctoral students. Furthermore, we had students from three different faculties. A follow-up study would have been valuable, as we are fully aware that we were unable to measure actual academic success. In the future, it would be interesting to follow the true productivity of the participants. For ethical reasons, especially as many of the questions were very private (e.g. relationship with one's supervisor) which may have even further endangered our response rate, we had to protect the informants' anonymity, and a longitudinal study was not possible. This was also the reason we were only able to use self-report measures.

In the future, more fine-grained instruments and mixed methods could be used to measure, for example, the varying dimensions of procrastination. Our questionnaire, however, was already quite extensive, since the data were part of a more extensive study on the doctoral experience (Pyhältö et al., 2009). Our intention was to minimise the number of questions and maximise reliability (Lonka et al., 2008; Richardson, 2004). Nevertheless, we still discovered interesting aspects of academic writing through our short, rather limited instruments.

Educational implications

The dynamics between the student and their scholarly communities appear to be important for both learning how to write and the doctoral students' well-being. The practices of scholarly communities and the variety of ways in which the doctoral students participate in these practices contribute to the dynamics, which further reflects their learning and well-being. Even though many such practices are domain specific, we demonstrated general aspects of academic literacy (Scardamalia & Bereiter, 1991) that could be taken into account when fostering the development of doctoral students. Interventions such as those presented by Lonka (2003) may be helpful. She focused on helping both the faculty and its doctoral students to rethink the writing process. She used the *Writing Process Questionnaire* as a tool to help both doctoral students and their supervisors reflect on and discuss their own conceptions of writing. She also emphasised the importance of developing constructive feedback strategies. This should be done both face-to-face and, as increasingly is the case, on line, in which case epistemic feedback is recommended (Guasch,

Espasa, Alvarez, & Kirschner, 2013). Since research writing takes place in scholarly communities, it involves a great deal of tacit knowledge and is not effectively learned from guidebooks (Kamler & Thomson, 2008). Thus we should adopt new forms of collaborative knowledge practices that motivate and support the long and stressful journey of doctoral students (Hakkarainen et al., 2013).

All good means of promoting occupational health (e.g. Bakker et al., 2008; Schaufeli & Bakker, 2004) should be implemented in graduate schools. Improvements in communication, collaboration and support are cost-effective ways of helping our doctoral students flourish. One of the key elements is understanding the nature of the academic writing process, including its epistemic and rhetoric dimension, and helping our students transform their ideas into brilliant texts.

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