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Risky Professions? Risk of Disability in Professions in Norway

Abstract: Modern professions provide important and essential services like engineering, financial services, and welfare state services. Sustaining a sufficient supply of these services requires professionals to remain in the workforce as long as possible. This article examines variation in the risk of disability pension among individuals with different professional education backgrounds according to the status of the profession and its primary task (i.e., caring for others, "life" professions; or providing other kinds of services, "thing" professions). Event history analysis was employed to examine register data for the Norwegian population from 1992 through 2008, with gender, age at completed education, birth year, and social status as control variables. The results indicate that individuals in low-status life professions were exposed to a greater risk of disability pension than individuals with other professional education backgrounds. Possible explanations are mechanisms related to selection effects, physical and mental job strain, and professional ethics.

Keywords: profession, disability pension, risk, autonomy, emotional stress, event history analysis

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Modern professions provide important and essential services, like engineering, financial services, health services, teaching, and social work. Moreover, many professions represent indispensable elements of the modern welfare state. The provision of professional services depends on the number of professional practitioners that the educational system can produce and the working life (i.e., the period of time in one's life that one works) of these workers. In this article, I focus on the working life of these workers. Gathering knowledge of factors influencing the length of the professional career is important in developing preventive measures so as to uphold a sufficient workforce of professionals.

Disability pension is one important form of exit from the workforce. Thus, I examine variations in the risk of disability among individuals with higher professional education. Less attention has been paid to the importance of professional education on the risk of disability. On the one hand, the risk is generally lower for individuals with higher education (Fevang & Røed, 2006; Foss & Skyberg, 2008). On the other hand, the relative size of this group is large and increasing. In 1997, 26 per cent of the Norwegian population had a higher education; by 2010, the percentage had increased to 37 per cent. A similar trend exists in most developed countries (Organisation for Economic Co-operation and Development [OECD],

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2012). Consequently, factors that influence disability in this group are increasingly more important in terms of the total number of disability benefit recipients in society.

Furthermore, it is of interest to study variations between different types of professions. Research indicates that variation exists in the disability rate between professions. Analyses of register data from 2001 through 2005 indicate that women working in the educational sector have a higher risk of disability than women in other sectors (Foss & Skyberg, 2008). Fevang and Røed (2006) report that individuals employed in teaching, nursing, and hairdressing have a higher risk of becoming disabled than other occupations.

The concept of profession and two dimensions

The concepts of profession and professional work can be defined in various ways. One characteristic aspect of professions is that they are occupations that demand relatively high education of their holders. Brante (2011) defines professions as "occupations conducting interventions derived from scientific knowledge of mechanisms, structures, and contexts" (p. 17). Another characteristic is that professions have obtained a social closure (Murphy, 1988), monopoly (Larson, 1977), or jurisdiction (Abbott, 1988) over certain tasks and autonomy over the performance of these tasks. Yet another characteristic is that the work done by professionals usually involves the provision of service. In this study, the main characteristics of professions are that they rely on a particular higher educational program (cf. Mastekaasa, 2008) and have managed to manifest themselves through a degree of social closure and social status in the population.

In this article, I examine the relevance of two theoretical dimensions of professions. The first dimension is the occupational status of the profession. In many ways, low-status professions constitute the bedrock of service production in society. Thus, if there is an occupational status gradient, which implies higher risk of disability for low-status professions, this may seriously affect the supply of essential services.

One interpretation of this dimension is the distinction between, on the one hand, full or ideal type professions (like the classical professions of law, medicine, theology, and university teaching and newer professions, such as architecture and engineering) and, on the other hand, semi-type professions (like nursing, teaching, and social work). Semi-professions are characterized by shorter training, lower legitimacy status, less established right to privileged communication, less specialized body of knowledge, less autonomy from supervision or social control than traditional professions, and a predominance of female workers (Etzioni, 1969; Horowitz, 1985; Howsam, Corrigan, Denemark, & Nash, 1976).

Some scholars question the distinction between full professions and semi-professions (Krejsler, 2005). However, they do not dispute the existence of status differences. The mechanisms or processes underlying these variations in status are open to discussion. In this study, I use the educational level that is required to become a legitimate practitioner of the profession as an indicator of the profession's status. Accordingly, professions demanding graduate (master's) education have a

higher status than professions demanding undergraduate (bachelor's) education (Eriksson, 2006).

The second dimension is the distinction between professions that take care of basic human needs or rights (e.g., health, basic education, and social or financial support) and professions that do not work in close contact with clients. If caring work implies physical or mental strain resulting in a higher risk of disability than in other professions, there is much to be gained from implementing measures that reduce this risk in these particular professions.

Barnett, Becher, and Cork (1987) define caring professions as professions in which "individual client's needs are significant" (p. 52). MacDonald (1995) distinguishes between caring professions in which trained individuals look after other people and take care of their needs, and uncaring professions in which this is not the case.

In the present study, I employ a modified version of the distinction between life professions and thing professions (Hellberg, 1999; Larson, 1977). According to Hellberg (1999), the dominant orientation within life professions is altruistic, which means that a concern exists for the happiness or welfare of people other than for oneself. By contrast, the dominant orientation in thing professions is utilitarian, which implies providing important material services for clients.

Life professions may, however, be distinguished from thing professions on the basis of work characteristics rather than value orientations. Life professions are relational professions (Moos, Krejsler, & Fibæk Laursen, 2004), which entails that establishing and maintaining relationships with other people, mainly clients, is an essential part of the practice. In addition, life professions may be characterized as human service professions because they typically operate within human service organizations, such as schools, hospitals, and social service agencies (Hazenfeld, 2009). In these organizations, people are the "raw material" – the input the organizations need to produce their product, namely, the welfare and well-being of their clients. Practitioners in life professions primarily perform emotional labor, which is relational in nature and involves management and display of certain feelings so as to produce an emotional state in another person (Hochchild, 1983). Thing professions typically perform cognitive work, which implies "the application of factual knowledge to the intellectual analysis of problems and rational decision making" (Guy, Newman, & Mastracci, 2008, pp. 6–7).

Disability pension and previous research on predictors

The percentage of individuals receiving disability benefit in Norway is high (about ten per cent of the working-age population), with Norway outranking most other countries in the percentage of disability benefit recipients (OECD, 2010). By the end of September 2012, 309,800 people received disability pension (Ellingsen, 2012). Both the number of absences from work caused by sickness and the number of disability pensioners have increased pronouncedly in Norway since the 1980s.

To obtain disability pension in Norway, claimants must fulfill several criteria. They must be between 18 and 67 years old and have at least a 50 per cent loss of work capacity. The loss must be mainly attributed to a medical condition. In the

typical case of a disability pensioner, the individual has had sick leave for a year, then receives vocational rehabilitation money, and is finally granted disability pension. A permanent disability pension is calculated in the same way as a retirement pension and consists of a basic pension, which is independent of income, and a supplementary pension, which is dependent on the receiver's previous income, as well as possible special allowances for individuals with no or low supplementary pension. On average, the pension amounts to 50 to 60 per cent of the receiver's previous income.

The most obvious reason, and a prerequisite, for receiving a disability pension is, of course, some sort of severe physical or mental illness or disability; however, even factors not directly related to health may influence the risk of becoming disabled. Reviews of previous research on disability pension (Allebeck & Mastekaasa, 2004; Bjørngaard et al., 2009) have categorized risk predictors into several groups.

First, there are demographic predictors like age and gender. In general, women have a higher risk than men, and the risk increases with age (Claussen & Dalgard, 2009; Gjesdal & Bratberg, 2002). There is also a higher risk of disability among immigrants (Claussen, Dalgard, & Bruusgaard, 2009; Claussen, Smeby, & Bruusgaard, 2012). Second, there are behavioral and lifestyle risk predictors like physical inactivity and smoking (Krokstad, Johnsen, & Westin, 2002). Third, there is the importance of social norms, regulations, and economic incentives in the risk of disability pension. Some studies indicate that disability may be socially "contagious" (Rege, Telle, & Votruba, 2007) or hereditary (Gravseth & Kristensen, 2008). In addition, unemployment and disability pension may be close substitutes (Bratsberg, Fevang, & Røed, 2010). Some studies also indicate that generous welfare arrangements increase the risk of moral hazard (Brinch, 2009).

However, there are two additional groups of risk predictors that are particularly relevant for this study, namely, socioeconomic status and working conditions. Regarding socioeconomic status, there is good reason to expect that the status dimension is relevant for the risk of disability. Many research contributions show a clear social gradient for health conditions. In their study comparing socioeconomic inequalities in health in 22 European countries, Mackenbach et al. (2008) find that in almost all countries, individuals with lower socioeconomic status have higher rates of death and poorer self-assessments of health than individuals with higher socioeconomic status. Studies also show a clear negative association between socioeconomic status and disability pension (Allebeck & Mastekaasa, 2004; Bjørngaard et al., 2009). The risk of disability pension is higher in groups with low education (Bruusgaard, Smeby, & Claussen, 2010; Johansson, Leijon, Falkstedt, Farah, & Hemmingsson, 2012) or low socioeconomic status (Haukenes, Mykletun, Knudsen, Hansen, & Mæland, 2011; Østby, Ørstavik, Knudsen, Reichborn-Kjennerud, & Mykletun, 2011).

Ross and Wu (1995) point to three categories of explanations for the relationship between education and health: (a) work and economic conditions (e.g., employment, full-time jobs, income, economic hardship), (b) social-psychological resources (e.g., personal control, social support), and (c) health-related aspects of lifestyle (e.g., exercise, alcohol consumption, smoking, preventive medical care). Nilsen, Ernstsen, Krokstad, and Westin (2012) find that these three factors explain some of the educational inequalities in the risk of disability pensioning but that a

substantial part of the inequalities remains even after controlling for these explanations.

Regarding working conditions, several studies indicate that physical and psychosocial factors are relevant to the risk of disability pension (Harkonmäki, 2007). Krokstad et al. (2002) find that unemployment, low job control, and high physical demands increase the risk of disability. Albertsen, Lund, Christensen, Kristensen, and Villadsen (2007) find that standing at work is a risk predictor for both men and women and that women have the additional risk predictors of arm lifting, neck bending, job insecurity, low decision authority, low social support, and high psychological demands. Ahola et al. (2009) conclude that burnout, particularly emotional exhaustion and cynicism, is a predictor for disability pension.

A review of the research shows that social status and working conditions are factors relevant to the risk of disability pensioning. However, there are, to my knowledge, no studies that systematically link these factors to the type of profession. There are also relatively few comparative studies of professions. Thus, my aim is to contribute to this area of research by providing a more detailed picture of the risk of disability in several professions than presented in other reports and to replicate earlier findings with a more detailed specification of professions. In addition, I examine the interaction between the status gradient (high status and low status) and the profession gradient (life professions and thing professions), which, to my knowledge, has not been done in previous studies.

Based on previous research, I propose the following two hypotheses:

H1: Individuals in low-status (undergraduate) professions have a higher risk of disability pension than individuals in high-status (graduate) professions.

H2: Individuals in human service (life professions) professions have a higher risk of disability pension than individuals in professions not directly involved in the well-being and welfare of individuals (thing professions).

I also put forth a third hypothesis regarding the effect of the combination of low-status and human service professions:

H3: The effect on the risk of disability pension related to human service (life) professions is higher for low-status professions than for high-status professions.

Material and methods

This study was based on register data from FD-trygd, a large database containing all social security benefits assigned to individuals in Norway from 1992 onward. For this study, data from 1992 through 2008 were available. I merged these data with demographic data from a general database.

Population

The database contains information about all individuals born between 1955 and 1990 and those born before 1955 who have completed higher education. From this base, I selected individuals who had completed one of the 25 professional educational programs included in this study.

I classified programs as professional educational programs if some sort of closure or jurisdiction based on legislation or credentials existed. Among the education programs, I identified the following 25 professions: clergy, physician, preschool teacher, general teacher, subject teacher, registered nurse, social educator, pharmacy technician, pharmacist, registered public accountant, state authorized public accountant, ergonomist, physiotherapist, social worker, child welfare officer, psychologist, journalist, Master of Business Administration (MBA), graduate engineer, architect, Master of Philosophy (MPhil) in economics, dentist, dental hygienist or technician, veterinary surgeon, and undergraduate engineer. If an individual had completed more than one professional education program, I kept the most recently completed education program.

Because registration dates for completed education before 1975 were considered to be unreliable, only individuals who had completed their professional education after 1974 were included. A few observations indicated that individuals had completed their professional education before the age of 20 years. These observations were excluded from the analyses because they were considered unreliable or uncertain.

Based on these criteria, the data consisted of 341,856 observations. In addition, I analyzed a subsample consisting of 216,370 observations for those individuals who had graduated from 1992 onward.

The dependent variable: disability pension

The dependent variable indicates whether or not an individual had received a disability pension in the period from 1 January 1992 through 31 December 2008. Some observations (n = 936) were left censored, meaning that they received disability pension before 1992.

The dependent variable is a combination of an indicator variable, which describes whether an observation denotes failure (i.e., the individual receives a disability pension in or before the registration period) or is right censored (i.e., the individual dies, emigrates, retires, or does not receive a pension within the follow-up period), and a time variable, which indicates the time elapsed in number of months from completed education to either disability pensioning or censoring. Obviously, for left-censored observations, the time period is not known.

The research variables: professions and typology of professions

Profession: In some analyses, the professions were coded one dummy variable for each profession – except for graduate engineers, which formed the base category.

Profession status: I based the distinction between low-status and high-status professions on the educational level. Education programs that corresponded to education at the bachelor's level were classified as low-status professional edu-

cation programs, and those that corresponded to education at the master's level were classified as high-status education programs. The placement of graduate engineers and MBA holders in the group of ideal type professions is in accordance with Mastekaasa (2008, pp. 104–105).

Because this distinction is intended to measure the social prestige of the professions, I validated my classification against three well-developed occupational status scales: the Standard International Occupational Prestige Scale (SIOPS), the International Socio-Economic Index (ISEI) of occupational status, and the Erikson–Goldthorpe–Portocarero (EGP) class schema (cf. Ganzeboom & Treiman, 1996). With the exception of clergy, my classification was in accordance with all three scales. I nevertheless included theology as a high-status profession because it represents one of the classic ideal type professions and requires education at the master's level.

Life or thing professions: I based the distinction between life professions and thing professions on whether or not the professionals mainly work with clients like patients, recipients of social security, and children. Professions within health, teaching, and social work were all classified as life professions. I also included clergy in this category. Thing professions consisted of professions within engineering, architecture, economics, and auditing. I excluded jurists, librarians, opticians, bioengineers, audiologists, and radiographers from the analysis because it was difficult to classify them as either life professions or thing professions.

Based on these criteria, I categorized the 25 professions in the study as shown in Table 1. Comparisons with analyses including these professions (categorized in a fifth group as unclassifiable) did not reveal any influence on the results.

Table 1
Classification of professions

	Thing profession	Life profession
High-status profession	Architect Graduate engineer MPhil in economics MBA Pharmacist State authorized public accountant	Physician Psychologist Dentist Veterinary surgeon Clergy
Low-status profession	Journalist Registered public accountant Pharmacy technician Undergraduate engineer	Preschool teacher General teacher Subject teacher Registered nurse Social educator Ergonomist Physiotherapist Social worker Child welfare officer Dental hygienist or technician

Note. MBA = Master of Business Administration; MPhil = Master of Philosophy.

Within each of the four categories in Table 1, one profession or a few professions dominated the category: 60 per cent of individuals with high-status thing professional education were graduate engineers, 81 per cent of individuals with low-status thing professional education were undergraduate engineers, 61 per cent of individuals with high-status life professional education were physicians, and 77 per cent of individuals with low-status life professional education were nurses, general teachers, or preschool teachers. The lack of balance within most of the groups implies that comparisons between the four categories must be interpreted with care because these dominant professions will, to a large extent, determine the estimates for each category of professional educational program.

Control variables

In addition to the two independent variables of professions and typology of professions, I included a number of variables to control for some important individual selection factors influencing the risk of disability:

Gender: This variable was used to compare the hazard of disability pension among women to the corresponding risk among men.

Age when education was completed: This variable was modelled as a quadratic function.

Immigration background: This variable was used to distinguish among no immigration background, first and second generation non-Western background, and first and second generation Western background.

Parental education level: For this variable, one dummy variable was created for the mother and one for the father; this variable was coded as 1 if the actual parent had higher education, 0 otherwise.

Parental income: The logarithm of the sum of parental income reported to tax authorities. Missing observations on income were coded as 0 on the income variable and as 1 on an additional dummy variable indicating whether income registration data were missing or not.

Fixed effects for age cohort: Because there may be unmeasured heterogeneity between age cohorts regarding the risk of disability, I included dummy variables for each year of birth (not reported in the tables).

Statistics

I analyzed the data by means of the Cox proportional hazards model. This model examines variations in the hazard function, which is the probability of "failure" (i.e., disability pension) at any point in time, given that the individuals have not failed so far. The hazard ratios convey the relative change in the hazard for failure when the independent variable increases by one unit. The model is semi-parametric because it makes no assumption about the baseline hazard; however, it assumes that the general shape of the hazard over time is identical for all individuals (Cleves, Gutierrez, Gould, & Marchenko, 2010).

I analyzed two different models. In the first model, I included professions as a series of dummy variables. In the second model, I included one dummy variable for professional status, one for the life or thing dimension, and an interaction term for the two dimensions. Table 3 and 4 present coefficients (hazard ratios) and confidence intervals. To check whether left censoring disturbs the results, I also conducted an analysis that included only the 216,370 observations for those individuals who had graduated from 1992 onward.

Analyses

Table 2 presents the number of individuals, rate of disability, proportion of women, and mean age in each profession.

Table 2
Professional education programs included in the study, Norway, 1992–2008

	Disability %	Women %	Age years	*N*
Social worker	7.7	77.6	31.4	9,503
Subject teacher	5.3	72.6	27.6	10,309
General teacher	4.3	68.9	27.6	46,252
Child welfare officer	4.1	82.8	29.2	6,518
Dental hygienist or technician	3.8	97.4	26.2	1,097
Ergonomist	3.4	89.7	28.1	3,419
Preschool teacher	3.1	93.4	26.9	37,552
Registered nurse	2.8	89.9	27.5	77,685
Social educator	2.8	79.5	30.6	10,992
Clergy	2.3	24.2	28.4	2,170
Physiotherapist	2.2	70.2	26.3	6,806
Architect	2.2	44.2	28.6	3,081
Psychologist	1.9	62.5	30.6	4,360
Dentist	1.7	48.4	26.6	3,088
Physician	1.6	43.8	28.7	14,740
Journalist	1.4	54.3	26.3	2,877
Veterinary surgeon	1.4	57.3	27.6	1,779
Pharmacist	1.1	75.7	26.1	1,561
MPhil in economics	1.1	31.8	27.9	2,742
Registered public accountant	1.0	55.8	27.8	4,484
MBA	1.0	31.9	26.6	17,626
Undergraduate engineer	1.0	16.6	26.0	33,766
State authorized public accountant	0.9	28.1	30.0	2,886
Graduate engineer	0.7	18.5	26.4	36,212
Pharmacy technician	0.3	90.6	27.6	351
Total				341,856

Note. MBA = Master of Business Administration; MPhil = Master of Philosophy.

Registered nurses represent by far the largest profession (measured by the number of individuals with a nursing education in the study period) in this study. General teachers, graduate engineers, undergraduate engineers and, preschool teachers represent other large professions. Engineers, accountants, economists, clergy, architects, physicians, and dentists are (more or less) male-dominated professions.

Table 2 also shows the frequency of disability pension in the various professions in the study. The table indicates that individuals trained as social workers had a pronouncedly higher rate of disability (almost eight per cent) than the other professions. Subject teachers, child welfare officers, general teachers, and dental hygienists or technicians also had relatively high rates of disability. In general, low-status life professions dominate in the upper part of the table, and thing professions (both low- and high-status professions) dominate in the lower part of the table. The results indicate that the risk of disability pension was considerably higher for individuals educated within programs for low-status life professions. In general, thing professions had low rates of disability.

However, these results must be interpreted with care because they do not take into account the time at risk for each individual (individuals who graduated later have a shorter time of risk). Event history analysis will reveal a more accurate picture of the hazard of disability pension.

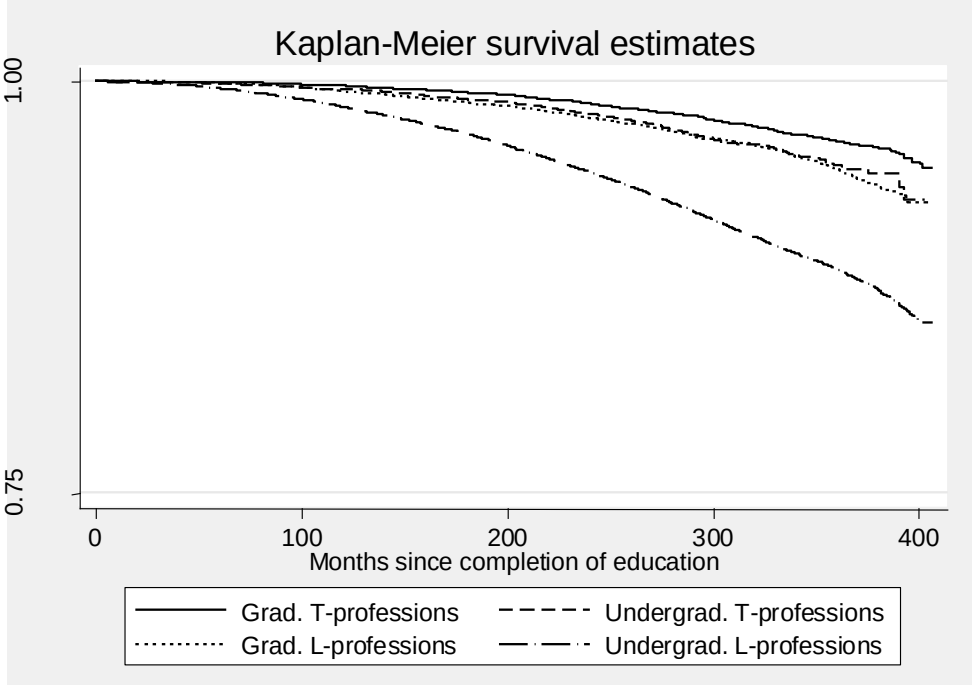

Figure 1. Survival function for the four types of professions (Grad. L-professions = graduate life professions; Grad. T-professions = graduate thing professions; Undergrad. L-professions = undergraduate life professions; Undergrad. T-professions = undergraduate thing professions). Norway, 1992–2008. N = 341,856. The scale of the y-axis is cut to vary between 0.75 and 1.

Figure 1 shows the Kaplan–Meier survival function for the four profession types (graduate thing professions, graduate life professions, undergraduate thing professions, and undergraduate life professions). The survival function is the proportion of individuals that does not "fail" at a certain number of months after completion of education, given that these individuals had not previously received disability pension. The x-axis shows the number of months that had elapsed since completion of the education.

As indicated in Figure 1, undergraduate life professions had the lowest probability of avoiding disability pension over time, and graduate thing professions had the highest probability of survival. The probabilities of survival rate for graduate life professions and undergraduate thing professions were in-between the highest and lowest rates.

Table 3 shows the results of the Cox proportional hazards model in which dummy variables for the individual professional education programs were included. The first model reveals the same pattern as seen in Table 2 but also some variations within each of the professional categories. In general, undergraduate life professions had higher hazard of failure (disability) than most of the other professions (all professions in the list were compared with the base group, graduate engineers).

The hazard ratios were less dramatic when gender, age at completion of education, birth year, immigration status, and mother's educational level and father's educational level were controlled for, but much of the pattern from the first model was still present: In general, undergraduate life professions had a higher risk of disability than other professions.

Some variation existed within each of the four professional groups. Among low-status life professions, physiotherapists had a lower risk than the other professions. In fact, journalists and undergraduate engineers had higher risks of disability pension than physiotherapists.

All the control variables had coefficients in the expected direction. Women had higher hazard rates than men. The hazard rate increased with age when education was completed. Compared with individuals who had not immigrated, the hazard rate was higher for first generation non-Western immigrants and lower for Western immigrants. The hazard rate was lower when parents had higher incomes. Interestingly, the analysis suggested that no difference existed between second generation immigrants and nonimmigrants regarding the risk of disability pension.

In the final analysis, I included the two dimensions – undergraduate (low-status) or graduate (high-status) professions and life or thing professions – in the model. The results are presented in Table 4.

Table 3

Relative risk (hazard ratio) of receiving a disability pension according to profession, gender, age at completed education, immigration background, parental education and income, and birth year (fixed effects, not reported); Cox proportional regression model; Norway, 1992–2008; N = 341,856

	Without control variables			With control variables		
	Haz. ratio	95% CI		Haz. ratio	95% CI	
Undergraduate life profession						
Social worker	9.89	(8.60	11.37)	3.46	(2.98	4.01)
Social educator	6.90	(5.85	8.13)	3.71	(3.13	4.41)
Ergonomist	6.78	(5.45	8.42)	3.87	(3.09	4.84)
Child welfare officer	6.67	(5.63	7.89)	3.45	(2.89	4.10)
Subject teacher	5.83	(5.04	6.74)	3.24	(2.78	3.77)
Dental hygienist or technician	4.79	(3.46	6.64)	3.14	(2.26	4.37)
General teacher	4.67	(4.11	5.30)	2.96	(2.59	3.38)
Preschool teacher	4.23	(3.70	4.82)	3.25	(2.82	3.74)
Registered nurse	3.94	(3.47	4.47)	2.92	(2.55	3.35)
Physiotherapist	2.84	(2.33	3.46)	2.04	(1.66	2.49)
Undergraduate thing profession						
Journalist	3.23	(2.32	4.51)	2.27	(1.63	3.18)
Pharmacy technician	2.16	(1.56	2.98)	1.96	(1.42	2.71)
Registered public accountant	1.85	(0.26	13.20)	0.58	(0.08	4.13)
Undergraduate engineer	1.64	(1.39	1.93)	2.14	(1.81	2.51)
Graduate life profession						
Psychologist	2.76	(2.15	3.52)	1.31	(1.02	1.68)
Clergy	2.07	(1.53	2.81)	1.58	(1.16	2.14)
Physician	1.97	(1.65	2.34)	1.31	(1.10	1.55)
Dentist	1.70	(1.26	2.28)	1.50	(1.11	2.01)
Veterinary surgeon	1.61	(1.07	2.42)	1.29	(0.86	1.94)
Graduate thing profession						
Architect	2.39	(1.83	3.12)	1.53	(1.17	2.00)
Pharmacist	1.66	(1.02	2.72)	1.53	(0.94	2.50)
MBA	1.64	(1.36	1.98)	1.58	(1.31	1.91)
MPhil in economics	1.49	(1.02	2.18)	1.20	(0.82	1.75)
State authorized public accountant	1.33	(0.89	1.98)	0.84	(0.56	1.25)
Graduate engineer (base)	1.00					
Women				1.53	(1.44	1.63)
Age at completed education				1.17	(1.15	1.20)
(Age at completed education) ^{2}				0.999	(0.999	0.999)
Immigration (base = none)						
- First generation non-Western				1.38	(1.18	1.61)
- Second generation non-Western				1.10	(0.27	4.38)
- First generation Western				0.68	(0.60	0.78)
- Second generation Western				0.88	(0.37	2.12)
Father's higher education				0.97	(0.90	1.03)
Mother's higher education				0.97	(0.89	1.06)
Log parental income				0.96	(0.93	1.00)
Parental income missing				0.66	(0.43	1.02)

Note. CI = confidence interval; Haz. = hazard; MBA = Master of Business Administration; MPhil = Master of Philosophy.

Table 4

Relative risk (hazard ratio) of receiving a disability pension according to type of profession, gender, age at completed education, immigration background, parental education and income, and birth year (fixed effects, not reported); Cox proportional regression model; Norway, 1992–2008. N = 341,856 (with left censoring, including all observations) and 216,370 (without left censoring, excluding all observations with completed education before 1992)

	With left censoring			Without left censoring		
	Hazard ratio	95% CI		Hazard ratio	95% CI	
Undergraduate (given T-prof.)	1.76	(1.55	2.00)	1.61	(1.21	2.12)
L-profession (given graduate prof.)	0.89	(0.78	1.00)	0.97	(0.69	1.37)
Undergraduate & L-profession	1.28	(1.09	1.50)	1.67	(1.13	2.48)
Gender (female)	1.56	(1.47	1.65)	1.31	(1.15	1.49)
Age at completed education	1.18	(1.15	1.21)	1.10	(1.02	1.19)
Age squared	0.999	(0.9	0.999)	0.999	(0.998	1.000)
Immigration background						
- First generation non-Western	1.32	(1.13	1.54)	1.19	(0.90	1.57)
- Second generation non-Western	1.11	(0.28	4.45)	1.56	(0.22	11.14)
- First generation Western	0.66	(0.58	0.75)	0.44	(0.27	0.72)
- Second generation Western	0.88	(0.37	2.12)	0.00	(.	.)
- No (base)	0.96	(0.90	1.03)	1.02	(0.88	1.18)
Father's higher education	0.97	(0.89	1.05)	1.05	(0.89	1.25)
Mother's higher education	0.96	(0.93	0.99)	0.94	(0.88	1.01)
Log parental income	0.66	(0.43	1.01)	0.55	(0.24	1.27)
Parental income missing	1.76	(1.55	2.00)	1.61	(1.21	2.12)
N	341,856			216,370		

Note. CI = confidence interval; L-prof. = life profession; T-prof. = thing profession.

When the effects of the control variables were adjusted for, the model indicated that undergraduate professions in general had a higher hazard of disability, given that they were thing professions (not human service professions). In other words, there was a tendency among thing professions for individuals with undergraduate professional education to have a higher hazard of disability than individuals with graduate professional education. Among the graduate professions, there appeared to be no difference between life and thing professional educational programs regarding the hazard of disability.

However, the highest hazard of disability was in the group of individuals with both undergraduate and human service (life) professional education. The results from the restricted sample without left censoring were similar to the results from the full sample.

Discussion

With some modifications, the analyses supported the previously outlined assumptions. Individuals in low-status (undergraduate) professions had a higher risk of disability than those in high-status (graduate) professions. For undergraduate professional education, individuals in human service (life) professions had a higher risk of disability than those in professions not directly involved in the well-being and welfare of individuals (thing professions). Within graduate professional education, no difference in the risk of disability was detected between individuals in life professions and those in thing professions. However, the results indicated clearly that individuals who pursued an undergraduate education within human service professions in general had a higher risk of receiving disability pension than students within other professions.

The analyses indicated correlations but did not permit definite conclusions to be drawn concerning generative mechanisms behind the correlations. However, some conjectures can be proposed about plausible mechanisms for the observed variations in the disability rate between professions. In the following paragraphs, I discuss three potential types of mechanism explanations – recruitment, working environment, and value orientations – as to why the type of professional education may be relevant for assessing the risk of disability pension.

The first set of potential mechanisms is based on the fact that certain professions may recruit individuals with specific traits that are relevant to the risk of disability. Relevant traits are demographic factors like gender and age, socioeconomic status, various physiological and psychological health dispositions, and individual value orientations. Women are more inclined to choose life profes-sions than men (Karlsen, 2012), and individuals with a low-status background are more inclined to choose an undergraduate-level education than the more "academic" graduate-level education (Hansen, 1999). Accordingly, higher risk of disability in life professions or low-status professions may be because of selection rather than characteristics of the work that professional practitioners do.

As much as possible, I controlled for selection mechanisms related to gender, age at completed education, age cohort, and social background (immigration status, parental education, and income). The analyses confirmed the relevancy of these individual factors. The variation in risk between professions decreased when gender, age, and social background were controlled for. However, the register data provided information on only these factors. Potential confounding selection mechanisms can be related to factors other than gender, age, or social background.

Thus, I may not have been able to control for relevant variations in physical and mental health dispositions, or value orientations among those who choose different professional studies. It may, for instance, be a reasonable assumption that life professions attract individuals who are more altruistic and more medically fragile. One experimental study shows that generosity was higher among student nurses than real-estate broker students; however, this was probably more out of moral obligation rather than pure altruism (Jacobsen, Eika, Helland, Lind, & Nyborg, 2011). It is also possible that those who choose high-risk professional educational programs are more vulnerable individuals at the outset of the education in other respects. A panel study of students in nursing, physiotherapy, and occupational

therapy shows, for instance, that the most important predictor of students' psychological distress at the end of the study is their psychological distress at the beginning of the study (Nerdrum, Rustøen, & Rønnestad, 2009). Thus, job strain and disability may be caused not only by characteristics of the profession but also by a more latent inclination for psychological distress.

The second set of potential mechanisms is related to the fact that particular professional education programs qualify individuals for work or working environments characterized by certain health risk factors. In the following paragraphs, I discuss three types of work-related mechanisms: (a) physical health risks, (b) risks related to lack of control and autonomy, and (c) risks related to doing caring work.

Professional practitioners within life professions and thing professions may be exposed to different physical risks. Individuals employed in thing professions (e.g., engineering) may be exposed to physical dangers related to industry, whereas those employed in life professions (e.g., health care, teaching, social work) may be exposed to dangers that arise from contact with clients. Among nurses, the most common risks are low back pain caused by heavy lifting of patients (Karahan, Kav, Abbasoglu, & Dogan, 2009) and patient violence (Atawneh, Zahid, Al-Sahlawi, Shahid, & Al-Farrah, 2003). Social workers often play a dual role because they endeavor to help people while acting within legal, financial, and human resource limits. Setting limits is also part of their work, and this may induce conflicts with clients and even client violence (Harris & Leather, 2012; Koritsas, Coles, & Boyle, 2010). A well-known risk facing child-care workers is parents' display of threatening behavior and violence (Littlechild, 2005). Such dangers may cause injuries resulting in disability. It is also a fair assumption that low-status professions are more exposed to dangerous working environments than high-status professions. Undergraduate engineers are probably more involved in manual industrial work (e.g., work in the oil industry) than graduate engineers, and undergraduate health workers are probably more exposed to dangers from direct contact with clients.

In addition, mechanisms related to differences in job control and autonomy may exist. Possessing graduate professional education gives individuals greater access to higher positions in the job hierarchy, positions with a higher degree of autonomy and control. One important aspect of the job environment that increases the risk of job strain is lack of control over the work situation (Maslach, 2003). Little control or codetermination in the work situation is also correlated with the risk of disability pension (Albertsen et al., 2007; Krokstad et al., 2002).

Professional autonomy is one distinct feature of professions; however, this autonomy is also under pressure in high-status professions (Dingwall, 2008). There may be a transition from responsibility to accountability within professions. To a greater degree, professional workers account for their results to employers, managers, and clients (Svensson & Karlsson, 2008). Nevertheless, the degree of autonomy is still likely to be one distinguishing feature between low-status and high-status professions. Professional workers with undergraduate education are probably more inclined to find a work position that is lower in the organizational hierarchy and, accordingly, experience a conflict between autonomy ideals and the reality of supervision.

The correlation between lack of autonomy and control and the risk of disability can be explained with Karasek's (1979) influential demand–control model, which

implies that work demands and control (skill discretion and decision latitude) determine occupational stress. If low-status professions have less autonomy and control, occupational stress may be higher for these professions than for high-status professions. Practitioners within low-status professions may also score high on the psychological stressors in the working environment (work demands) and, thus, experience a higher level of workplace stress than other professions.

Mechanisms related to particular risks of doing caring work may also exist. A prerequisite for practitioners doing emotional work is to find an adequate balance between caring for others and caring for oneself. Maslach (2003) describes burnout as a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment among individuals who work with people. According to Maslach, stress arises from the social relationship between the individual who gives help and the individual who receives it. Emotional overload and exhaustion are reactions to extensive contact with other individuals, particularly those experiencing troubles or problems. The emotional exhaustion may lead to psychological detachment from meaningful interaction with other people. This detachment is an attempt at emotional self-protection when the professional's commitment to helping is overwhelming. The final step in the process is reduced personal accomplishment or efficiency, which implies that the worker is no longer capable of sensitivity and caring for other people.

Burnout is mainly related to the social environment in which individuals work. The following characteristics of this environment may increase the risk of burnout: work overload, lack of control, insufficient reward, the breakdown of community, unfairness, and significant value conflicts (Skovholt, 2000). Schaufeli, Leiter, and Maslach (2009) point out that since the 1970s, research on burnout and mental stress has focused on the risk in human service professions.

Research indicates that emotional labor or caring for other people implies risks of mental stress and burnout (Enzmann, 2005; Guy et al., 2008; Maslach, 2003; Schaufeli et al., 2009; Skovholt, 2000). Thus, possible mechanisms behind the high rate of disability pension in low-status life professions are related to the risk of mental distress, fatigue, and burnout in human service professions owing to a lack of autonomy or control over a work situation or a stress or a conflict caused by contact with and taking care of clients (Ahola et al., 2009).

The third set of potential mechanisms is that professions may be distinguished by various value orientations, or professional ethics. These are essential values and orientations that are passed onto students during education. However, these values may also influence perceived job strain and, accordingly, the health of individuals and their decision to seek disability pension.

Educational programs in life professions emphasize altruistic values and obligations to serve clients, whereas thing professions emphasize instrumental problem solving and efficiency. Throughout their education, students pursuing human service professions are instilled with ethical values that emphasize the importance of dialogue and altruism, which implies an obligation to listen to and help clients and to prioritize the interests of clients over one's own interests, and equality (Hellberg, 1999). Although such values are important and indispensable for a professional practice, they may also form the basis for mental stress and burnout. The inability to distinguish between ideals and realities is one factor that

may deplete the personal self. It is often difficult for practitioners to accept that they cannot perform at the 100 per cent level, 100 per cent of the time (Skovholt, 2000).

The danger of not being able to set boundaries and to reject unreasonable help requests is relevant for all social workers, teachers, and health workers. However, this may be even more critical for social workers and teachers. The ability to establish trust and dialogue in relationships with clients is vital for social workers. The practitioners may feel inadequate because they are able to help the client only to a limited extent. Teachers may experience the same limitations in their relationships with pupils. Thus, one may expect the risk of emotional exhaustion and eventual burnout to be relatively higher in these professions, which are characterized as involving intensive work with other individuals. In that case, professional educational programs, although good at conveying ethical values, may not be equally good at preparing students for reality and the imperativeness of finding an adequate balance between idealism and reality.

These mechanisms must be considered as suggestions for plausible explanations of the empirical results. In addition to these mechanisms, other potential explanations exist. One of these is that individuals in welfare professions have more knowledge about and access to the social security system. This may induce moral hazard among those who work within these professions.

Conclusion: risky professions?

The main result of this study was that risk of disability pension was particularly high in low-status life professions. The results showed that even within the assumed privileged group of individuals with higher education, substantial variations existed in the risk of disability pension. Some professions appeared to be riskier than others. The professions identified as high risk are important professions in the provision of welfare services. Thus, a more thorough understanding of the mechanisms that cause this pattern will provide invaluable knowledge that can be used to take action in minimizing the gap between some of the human service professions and professions with low risk of disability.

In the present study, I outlined several sets of mechanisms that may explain this result. These mechanisms included the selection of vulnerable individuals to low-status life professions, work-related mechanisms like physical risks or psychological risks caused by lack of autonomy and job control or working with people, and professional ethics.

The relatively high quality of the register data and the comparative approach taken represent the advantages of the present study. However, one major drawback of the study is the limited possibility of testing mechanism explanations. The study lacked the variables necessary for empirically based conclusions on the processes behind the observed variations in the risk of disability between professions. One solution is to integrate data on diagnoses, which, to a certain extent, can reveal what kind of illness has caused the disability. Another solution is to carry out comparisons of siblings, which will help control for potential confounding variables causing selection effects. Conducting panel studies following individuals

in various professions from start of study to their professional career, preferably linked with register data, will also provide valuable knowledge about various kinds of job-related mechanisms behind the physical and mental well-being of professional practitioners.

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