

RESEARCH

Disability, Labour Market Participation and the Effect of Educational Level: Compared to What?

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The aim of the article is to discuss the relationship between disability, educational level and employment, and to scrutinize how disability and education interact to impact employment – a link that has been observed in several studies. The article uses analyses of EU-SILC data to illustrate that conclusions about whether higher education reduces labour-market inequalities between disabled and non-disabled, depends in part on the analytical strategies used, which in turn are guided by implicit or explicit theoretical assumptions about the mechanisms regulating the relationship between education and employment opportunities. The article argues that the issue is more multifaceted than recognised by Nordic disability policy, which claims that higher education is the route to reducing inequalities and enhancing societal inclusion for disabled people.

Keywords: Disability; living conditions; education; labour market participation; social inclusion

Introduction

Participation in the labour market through employment is regarded as one of the cornerstones of active citizenship for disabled people (Sainsbury and Coleman-Fountain 2013). In research and policy on disability and labour market participation, it is considered as established knowledge that educational level is one of the most important predictors of employment for persons with disabilities, and that it is therefore an effective way to improve disabled people's chances in the labour market and reduce the systematic differences in employment rates between disabled and non-disabled people. The question of which factors may increase disabled people's competitiveness in the labour market is of political as well as academic interest, particularly in economic downturns, when there is increasing unemployment and higher competition for jobs.

The salience of education, and in particular 'higher education', is well documented in national (Kittelsaa, Wik, and Tøssebro 2015; Wik 2010; Molden, Wendelborg, and Tøssebro 2009; Grue and Finnvold 2014; Bliksvær and Hanssen 2006; Finnvold 2013; Legard 2013; Bø and Håland 2015) as well as in international studies (Holland et al. 2011; Zaidi 2011; OECD 2003). Research has shown that education is the most important predictor of employment for disabled people, but has also found a statistical interaction in the relationship between disability, education and work propensity: educational level is substantially more important for the employment rate for disabled people than for non-disabled people. This effect is often found to be around twice as high for disabled compared to non-disabled (e.g. Kittelsaa et al. 2015; Tøssebro and Wik 2015), however estimates in different studies vary from 11 per cent (e.g. Bø and Håland 2015) to over 200 per cent higher (e.g. Bliksvær and Hanssen 2006).

Although there is ample documentation that educational level has a significant impact on both disabled and non-disabled people's employment rates, there is less clarity about the significance of the effect and what educational level that increases the likelihood of employment the most. Even the question of whether the impact of educational level is stronger for disabled than for non-disabled people may be up for debate. Conclusions about these issues depend on the methodological and substantial/theoretical choices and assumptions researchers have made, including *how* comparisons are made and with *what*. This article argues that these methodological and theoretical premises are not separate issues, but are intertwined. Different types of data (register data, survey data) provide different opportunities to operationalise the main variables (impairment and employment), and this in turn gives different labour market participation rates as well as different measurements of the 'effect' of the educational level. There are several possible statistical comparisons that can be made and that can be justified on theoretical grounds, and which one is chosen will affect both the observations and the conclusions that may be drawn.

Aims of the study

The aim of the article is to discuss the relationship between disability, educational level and employment, and to scrutinize how disability and education interact to impact employment – a link that has been observed in several studies. The article focuses on two questions related to the thesis of the ‘double effect’ of education on employment. First, it looks at which educational level has the highest effect on employment rates. At least two questions are involved here: which educational level is most effective in increasing employment for disabled people? And which educational level is most effective in reducing inequalities between disabled and non-disabled people? Compulsory, upper secondary and tertiary education are pathways to qualitatively different skills and occupations, and therefore also to different work environments, types of contracts, wages, social networks and opportunities. About one-third of the Norwegian population aged 16 to 66 has completed education at the tertiary level, and it would be of significant interest to know the difference between the two levels within tertiary education. We shall therefore include a comparison of tertiary education at the undergraduate level on the one hand and the graduate/postgraduate level on the other hand. However, the primary aim of the article is not to estimate the size of the effect of education in a strict causal sense, but rather to illustrate how different methods of comparison will affect the results of the analyses.

My second question concerns the various possibilities for relevant comparisons when analysing the issue using cross tables, and how the choice of the method of comparison often is also connected to theoretical considerations or postulations. Different statistical comparisons affect the observations that can be made and conclusions that can be drawn about the impact of educational level on labour market participation. I will also address what it may mean for the comparison that disabled people generally have low employment rates while non-disabled people have high rates of employment.

Disability, education and labour market participation

The main picture of lower participation in paid work for the disabled is consistent across studies (Kittelsaa, Wik, and Tøssebro 2015) and across countries (Bliksvær and Hanssen 2006; Holland et al. 2011; Lillesto and Sandvin 2014; Sainsbury and Coleman-Fountain 2013; Zaidi 2011). However, reported employment rates for disabled and non-disabled people also vary depending on how disability is operationalised (Molden and Tøssebro 2012), which types of data sets are used and how the questions measuring work status are formulated. For instance, Bo and Håland (2015) observe that in the Norwegian labour force survey (LFS), for people aged 15–66, 43 per cent of disabled people were employed, compared to 74 per cent in the total population in the same age group. In a special 2007 edition of the National level of living survey for disabled people, Molden et al. (2009) found that 50 per cent of disabled people were employed, compared to 87 per cent for the non-disabled. According to Tøssebro and Wik (2015), the labour force surveys underestimate the labour market marginalisation of the disabled, in part because only one hour of work a week is required to be included in the category ‘employed’. Tøssebro and Wik (op. cit.) also observe a tendency that analyses based on surveys of living conditions result in higher employment rates than analyses using labour force surveys. It is important to take such differences in employment rates between surveys into consideration, as they may affect the results of comparisons between disabled and non-disabled people, as we will see later in the article.

Researchers have identified a set of factors that help explain the observed differences in labour market participation between disabled and non-disabled people. These factors are impairment, health status, gender, age, whether the impairment is congenital or acquired, educational level and ethnic background (Kittelsaa et al. 2015; Tøssebro and Wik 2015; Molden et al. 2009). All of these factors have been found to have a strong effect on the likelihood of being in work, but some studies find that education is by far the most important (Bjerkan and Veenstra 2008). Researchers have focused on educational level in particular; this factor differs from the others in that it is possible to influence it through political means. In the Nordic welfare states, education has also been regarded as an important instrument for reducing inequalities between social groups.

There is scholarly consensus that the statistical impact of education on employment is substantial, and there are also indications that this impact increases over time (Tøssebro and Wik 2015). Tøssebro and Wik (op. cit.) find that, with the exception of one study (Legard 2012), the overall picture in the reviewed research seems to be ‘the more education the better’. ‘More’ here means going from a lower to a higher level of finished grades/exams in a system with three main levels: compulsory education (year 1–10), upper secondary (year 11–13) and tertiary education at the lower (undergraduate) or higher (graduate/postgraduate) level. Accordingly, an implicit or explicit conclusion in this research is often that tertiary education gives the highest likelihood of employment.

Research has not only established the importance of education for the probability of having a job, but has also identified a statistical interaction between education and disability status on the probability of being in paid work, where the effect of higher education is found to be substantially higher for disabled people than for non-disabled people. Several scholars comment on this interaction (Tøssebro and Wik 2015; Kittelsaa, Wik and Tøssebro 2015; Tøssebro 2012; Wik 2010; Molden et al. 2009; Bliksvær and Hanssen 2006; Norvoll and Fossestøl 2010; Legard 2013; Vedeler and Mossige 2010; Grue and Finnvold 2014; Sainsbury and Coleman-Fountain 2013; Zaidi 2011), but the magnitude of the interaction varies substantially between studies, depending on the type of data sets, definitions, statistical methods

used and procedures for comparing percentage differences. However, scholars appear to agree that the effect of higher education (university level) as compared to compulsory education is about twice as high for disabled people compared to non-disabled people (Kittelsaa et al. 2015). Molden et al. (2009: 29) analysed a labour force survey and found that after controlling for gender, age and ethnicity, the odds ratio for higher education (i.e. tertiary education – university level, 14 years or more) as compared to compulsory education (1–10 years) on employment was 4.4 for disabled people and 2.2 for non-disabled people, or in other words twice as high for disabled people compared to non-disabled people. Furthermore, the odds ratio for upper secondary education (11–13 years) was 2.2 for disabled people and 1.3 for non-disabled people, or almost the same proportional difference between disabled and non-disabled people. However, the results in different studies show substantial variation, ranging from 11 to 25 per cent higher effect of education for disabled people (e.g. Bø and Håland 2015) to nearly three times (or '200 per cent') (Bliksvær and Hanssen 2006) higher. The studies are based on different data sets and different statistical techniques. Bø and Håland's (op. cit.) results are based on a Norwegian Labour Force Survey, and they compare 'disabled people' with 'the general population', i.e. including the disabled. Grue and Finnvoll's (2014) study was based on register data for young adults. Bliksvær and Hanssen's (2006) study compared disabled with non-disabled people and was based on a European data set containing 29 countries. They found that the observed pattern holds for both the Norwegian data set and for the pooled data set of 28 European countries. For Norway, they found that the proportion in paid work was 15 per cent for disabled people with compulsory education and 57 per cent for disabled people with completed education at the tertiary level, i.e. an increase of 2.8 times. This study compared 'disabled' with 'non-disabled' people, i.e. mutually exclusive groups. For the non-disabled, the corresponding rates were 44 per cent (compulsory education) and 84 per cent (tertiary education), or an increase of 0.9 times.

The effect of education on participation in the labour market has become a central 'fact' within research and politics on disability and inclusion. In research there is substantial support for the idea that the effect of education is greater for disabled people than for non-disabled people, but the magnitude of the effect varies substantially between studies, in part due to different methodological procedures and possibilities in the data. Furthermore, the substantial differences in employment rates between the two groups also affect our observations about the effect of educational level on employment. Nonetheless, it would be too easy to reduce the issue to a matter of methodological choice and arbitrariness. The methodological choices and empirical analyses are also based on underlying theoretical premises that explicitly or implicitly guide them, and thereby also guide the interpretations and conclusions that are drawn. Similarly, to draw the practical inference that higher education will increase the employment rate for the disabled as a group based on an observed strong statistical association between educational level and employment in a set of survey data is not only a matter of methodology, but is based on specific (if not always explicit) theoretical assumptions about the mechanisms for the creation and distribution of jobs in the labour market.

Data and methods

The empirical analyses in the paper are based on data from the national survey of income and living conditions 2014, collected by Statistics Norway (SSB)¹. Since 2011, the annual living conditions surveys in Norway have been coordinated with 'EU-SILC',² and contain a random sample from the Norwegian population aged 16 and older.

Level of living surveys provide possibilities for studying the living conditions of disabled people, and are a source of knowledge about social and economic inequalities between disabled and non-disabled people, both in our society and between societies (Zaidi 2011). However, there are also limitations in such surveys that must be kept in mind when doing or reading analyses of disability and living conditions in particular (Tøssebro and Kittelsaa 2004). Since survey data is based on head-counting, a fundamental challenge occurs when one wants to operationalise the concept of 'disability' according to a relational or situational understanding of the phenomenon (Söder 2004). The set of standardised questions that can be used to identify 'disabled people' in level of living surveys are rooted in an understanding of disability as negatively valued individual characteristics (op. cit.). Another potential problem is that the sampling procedures do not include persons in institutions (hospitals, care institutions etc.), thereby excluding the individuals with the perhaps most restrictive impairments.

In the EU-SILC survey there is a set of questions that can be used to define disability status based on respondents' self-assessment (Molden and Tøssebro 2012; Zaidi 2011). The survey has two initial questions about the respondents' subjective assessment of long-standing health problems or impairments, and follow-up questions mapping activity

¹ The data is collected by Statistics Norway (SSB), and has been provided by the Norwegian Centre for Research Data (NSD). (<http://www.nsd.uib.no/nsd/english/index.html>) Neither SSB nor NSD can be held responsible for analyses or interpretations in this paper. In the paper an 'extended' set of EU-SILC data is used. The data set is delivered by SSB/NSD, and combines the full EU-SILC 2014 sample, in addition to the rotation group that exited after EU-SILC 2013, plus the new rotation group in EU-SILC 2015. The purpose of adding observations from 2013 and 2014 has been to increase the sample size and reduce error margins when analysing subgroups. The data set has 9,596 observations unweighted/18,489 weighted. 'Disabled people' constitute 1,482 (or 15.4 per cent) unweighted/3,019 (or 16.3 per cent) weighted.

² EU-SILC is coordinated through Eurostat and is a European survey covering income, social inclusion and living conditions. EU-SILC is a panel survey with a four-year rotating panel. Every year one part of the sample rotates out, and a new part rotates in.

limitations related to these health problems or impairments. Since this structure distinguishes between the impairment/health problem on the one hand and activity restrictions on the other, it can be said to be in line with the logic of the ICF framework (WHO 2001).

Disability: In this article the category 'disabled' includes persons who have answered in the affirmative on either of the two initial questions (answer options in parentheses): 'Do you have any long-standing illness or health problems?' (yes/no) or 'Do you have any disability or impairments from injury?' (yes/no), and answered in the affirmative on both of the follow-up questions: 'Do the aforementioned problems restrict your everyday activities' (yes/no), and 'Have these restrictions lasted six months or more?' (yes/no). When we use this definition, 16.3 per cent of respondents are in the category 'disabled', and 83.7 per cent are 'non-disabled'. This proportion is in line with the common range of prevalence rates for disability in studies using survey data (Molden and Tøssebro 2012).

Employment: In the EU-SILC-study, the respondents are asked questions about labour force status according to the conceptual framework of the International Labour Organisation (ILO).³ This is the same conceptual framework that is used in the labour force surveys (LFS), and which will be used in this article. In this framework, 'employed persons' are persons who during a reference week either a) worked for at least one hour for pay or profit or family gain, or b) were not at work during the reference week but had a job or business from which they were temporarily absent due to sickness or other reasons. Another approach often used in living condition surveys is to ask about the respondents' 'main activity' (employed, education, receiving pensions, homemaker etc.). Some studies, like the Norwegian 2014 EU-SILC, include both options for identifying employment. The ILO definition of employment represents a relatively low threshold for being defined as employed (one hour work a week), and therefore also gives higher estimates of 'employed' than the approach asking about the 'main activity' (Kittelsaa et al. 2015). The ILO formulation probably also includes more part-time work or casual work (i.e. more insecure employment contracts) than the 'main activity' formulation. Thus, looking at persons between 16–66 years of age, we get an employment rate of 55 per cent for disabled people and 83 per cent for non-disabled people. This is a relatively high employment rate for disabled people, and within the higher end of the observed range in survey-based studies of labour force participation for the disabled – ranging between 32 and 56 per cent depending on the selected operationalisation of disability (Molden and Tøssebro 2012). This is acceptable for the purpose of this article, where the main goal is not to estimate population values for the employment rates of disabled people and non-disabled people, but to compare participation rates by educational level, disability and age group.

Educational level: Information about education is added to the data from a public register (utdanningsregisteret), and is coded according to the Norwegian standard for educational coding (NUS2000)⁴ into four categories: 1 = Compulsory education (1–10) (no education + primary education + lower secondary education), 2 = Upper secondary education (11–13) (Upper secondary basic education + upper secondary final year + post-secondary non-tertiary education), 3 = Tertiary, undergraduate (14–17) (First stage of tertiary education, undergraduate level), 4 = Tertiary, graduate and postgraduate (18+) (First stage of tertiary education, graduate level + second stage of tertiary education/postgraduate).

Data is analysed using contingency tables, produced with SPSS version 22.

Results

Educational level

Before we proceed to the analysis of the relationship between educational level and employment, we need to have an understanding of how educational level is distributed for disabled people and non-disabled people. Several studies have documented that persons with impairments have a lower average educational level than persons without impairments (Kittelsaa et al. 2015; Grue and Finnvoll 2014; Tøssebro and Wik 2015; Molden, Wendelborg and Tøssebro 2009; Bliksvær and Hanssen 2006; Finnvoll 2013). Since the educational level in the population has increased in recent years, and since the probability of having an impairment increases with age, comparisons of education between disabled and non-disabled people should also be controlled for age (Kittelsaa et al. 2015).

In **Table 1** we observe that 4 per cent of disabled people between 16–66 years of age have completed education at the graduate or post-graduate level and 20 per cent have completed an undergraduate degree. This is somewhat higher than for instance Finnvoll (2013) observed in his study based on register data, though we must keep in mind that Finnvolds' study focused on a younger age group. For non-disabled people the corresponding rates are 9 and 26 per cent. We thus see that education at graduate/postgraduate level is more than twice as common for non-disabled people as for disabled people, and an undergraduate education is about 25 per cent more common. This also means that the percentage difference between disabled and non-disabled people in terms of the proportions with education at the highest (graduate/postgraduate) level (5.5 percentage points) accounts for half of the overall difference (11.6 percentage points) in the proportions who completed tertiary education. We also observe that the share of the population with tertiary education reaches a peak in the group aged 35–44 years for both the disabled and the non-disabled.

³ http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_labour_force_survey_-_methodology.

⁴ Level of Living EU-SILC, 2014, Study Documentation, Statistics Norway 2015.

Table 1: Educational level by disability status and age group. Source: EU-SILC 2014, Norway, Statistics Norway.

	Educational level	Non-disabled	Disabled	All
16–24 years	Compulsory (1–10 yrs)	56,7%	53,6%	56,5%
	Upper secondary (11–13 yrs)	32,8%	35,1%	32,9%
	Tertiary, undergrad. (14–17 yrs)	10,4%	11,3%	10,4%
	Tertiary, grad + postgrad (18+)	0,2%	0,0%	0,2%
	N(=100%)	2296	194	2490
25–34 years	Compulsory (1–10 yrs)	19,0%	32,0%	20,1%
	Upper secondary (11–13 yrs)	32,0%	37,2%	32,4%
	Tertiary, undergrad. (14–17 yrs)	33,5%	24,2%	32,7%
	Tertiary, grad + postgrad (18+)	15,5%	6,5%	14,7%
	N(=100%)	2417	231	2648
35–44 years	Compulsory (1–10 yrs)	12,1%	28,5%	14,7%
	Upper secondary (11–13 yrs)	39,1%	42,7%	39,7%
	Tertiary, undergrad. (14–17 yrs)	35,2%	24,6%	33,6%
	Tertiary, grad + postgrad (18+)	13,5%	4,2%	12,1%
	N(=100%)	2639	480	3119
45–54 years	Compulsory (1–10 yrs)	17,6%	32,5%	20,2%
	Upper secondary (11–13 yrs)	48,4%	44,3%	47,7%
	Tertiary, undergrad. (14–17 yrs)	25,0%	19,9%	24,1%
	Tertiary, grad + postgrad (18+)	9,0%	3,3%	8,0%
	N(=100%)	2554	542	3096
55–66 years	Compulsory (1–10 yrs)	17,3%	25,5%	19,1%
	Upper secondary (11–13 yrs)	52,6%	53,7%	52,8%
	Tertiary, undergrad. (14–17 yrs)	22,6%	16,8%	21,3%
	Tertiary, grad + postgrad (18+)	7,5%	4,0%	6,8%
	N(=100%)	2787	792	3579
All	Compulsory (1–10 yrs)	23,7%	31,0%	24,8%
	Upper secondary (11–13 yrs)	41,4%	45,7%	42,1%
	Tertiary, undergrad. (14–17 yrs)	25,6%	19,5%	24,7%
	Tertiary, grad + postgrad (18+)	9,3%	3,8%	8,4%
	N(=100%)	12693	2239	14932

The 'effect' of educational level on employment – how and what to compare?

Table 2 presents labour force participation statistics (employment rate, unemployment rate, inactivity rate) for disabled and non-disabled people by educational level for persons aged 16–66 and split by the two age groups 16–45 years and 45–66 years respectively. **Figure 1** gives a visual presentation of the employment rates by educational level for the same age groups. **Table 3** summarises different comparisons of the employment rates in **Table 2**.^{5,6}

From **Table 2** and **Figure 1** we immediately recognise that disabled people have a substantially lower employment rate than non-disabled people, at any educational level and also regardless of age group. Furthermore, the difference in employment rates between disabled and non-disabled people is notably smaller at the highest educational level than at the lower, indicating a stronger positive correlation between educational level and employment rate for disabled people

⁵ We do not speak about effects in a strictly causal sense here, since we do not control for all relevant independent variables.

⁶ Because of the low N among disabled people with tertiary graduate/postgraduate education (N = 35 and N = 50), we have omitted this group in the comparisons in Table 3.

Table 2: Labour force status by educational level and disability status. Source: EU-SILC 2014 Norway, Statistics Norway.

16–66 years		Compulsory (1–10 yrs)	Upper secondary (11–13 yrs)	Tertiary, undergrad. (14–17 yrs)	Tertiary, grad.+postgrad (18+)	All
Non-disabled	Inactive	24,7%	12,3%	6,8%	2,5%	12,9%
	Employed	67,3%	85,3%	91,0%	95,8%	83,5%
	Unemployed	8,0%	2,4%	2,2%	1,7%	3,6%
	(N = 100%)	3011	5260	3246	1176	12693
Disabled	Inactive	52,1%	40,7%	27,5%	16,5%	40,7%
	Employed	41,1%	56,9%	68,9%	81,2%	55,3%
	Unemployed	6,8%	2,3%	3,7%	2,4%	4,0%
	(N = 100%)	693	1024	437	85	2239
16–44 years						
Non-disabled	Inactive	26,7%	10,6%	4,9%	1,2%	12,6%
	Employed	63,0%	85,8%	92,0%	96,7%	82,1%
	Unemployed	10,3%	3,6%	3,2%	2,0%	5,2%
	(N = 100%)	2081	2558	1977	736	7352
Disabled	Inactive	42,9%	27,9%	19,9%	0,0%	30,3%
	Employed	47,3%	68,8%	76,0%	94,3%	63,9%
	Unemployed	9,8%	3,3%	4,1%	5,7%	5,9%
	(N = 100%)	315	359	196	35	905
45–66 years						
Non-disabled	Inactive	20,2%	14,0%	9,9%	4,5%	13,3%
	Employed	76,8%	84,8%	89,5%	94,3%	85,3%
	Unemployed	3,0%	1,2%	0,6%	1,1%	1,4%
	(N = 100%)	930	2702	1269	440	5341
Disabled	Inactive	59,8%	47,7%	33,6%	28,0%	47,8%
	Employed	36,0%	50,5%	63,1%	72,0%	49,5%
	Unemployed	4,2%	1,8%	3,3%	0,0%	2,7%
	(N = 100%)	378	665	241	50	1334

than for non-disabled people. This is the statistical interaction between educational level and disability in relation to employment referred to earlier and which has been the focus of several studies.

We shall now turn to a more rigorous comparison of the employment rates in **Table 2**, in order to illuminate the question of the effect of educational level on the employment rate. The different comparisons are not only different methodological viewpoints, but to some extent also reflect different ideas about mechanisms in the labour market, which is a point we shall return to.

The upper part of **Table 3** first presents three different percentage differences (for each age group), which are the percentage point increases in the employment rate when we compare the employment rate at a specific educational level with the employment rate at one of the higher educational levels.⁷ We observe that every increase in educational level is followed by a larger or smaller increase in the employment rate, in both age groups and both for disabled and non-disabled people. In both age groups and for both disabled and non-disabled people we observe that the single step with the largest increase in employment rate is between *compulsory* and *upper secondary* education (for persons 16–44 years the figures are 21.5 and 22.8 percentage points for disabled and non-disabled people respectively, and for persons 45–66 years the figures are 14.5 and 8.9 percentage points). We also observe an increase in the employment rate between *upper secondary* and *tertiary* education (for both disabled and non-disabled people, in

⁷ All 12 per cent differences in table 3 are statistical significant at $p < .05$ level (chi-square test).

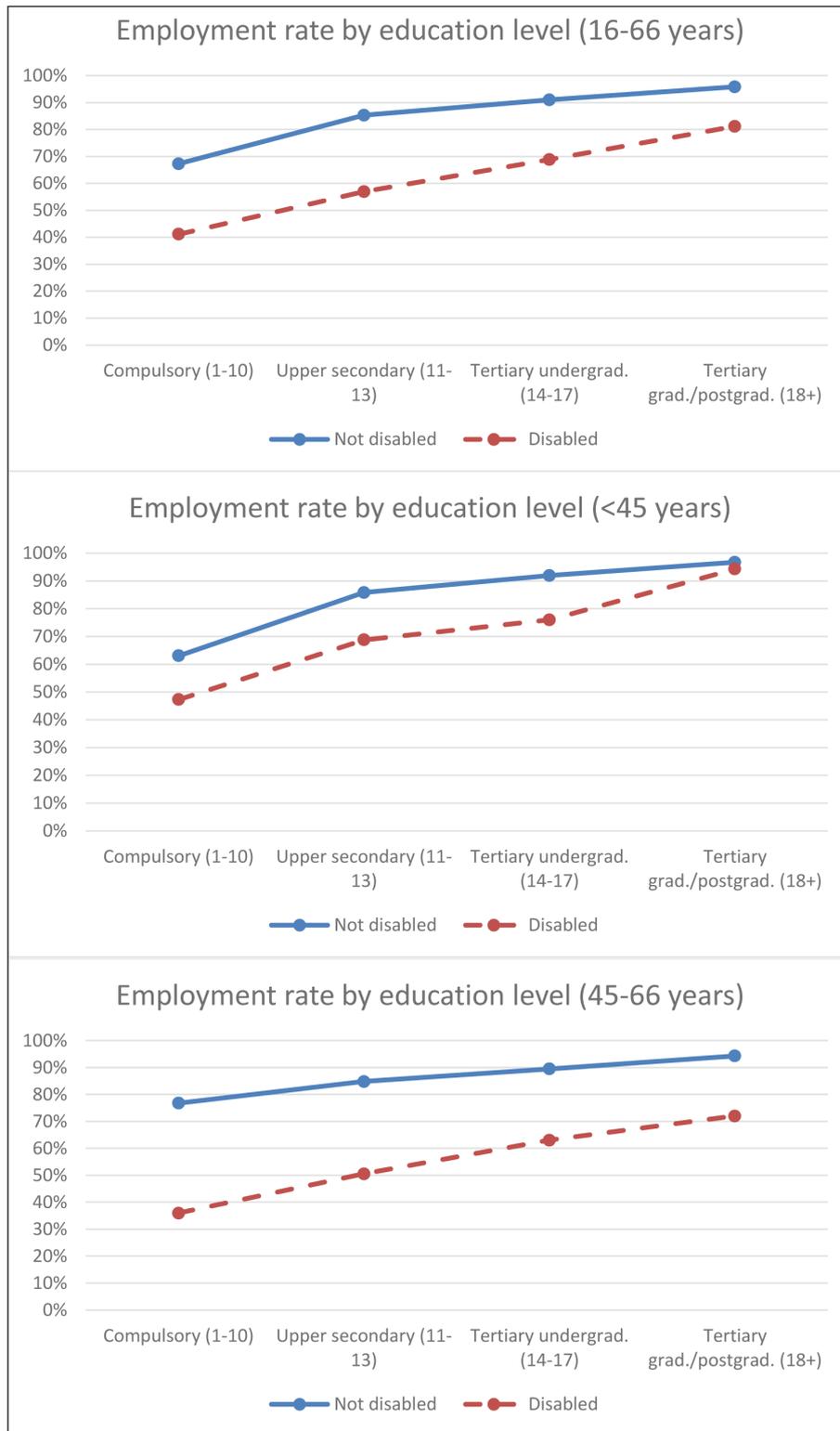


Figure 1: Employment rate by educational level and disability status.

Source: EU-SILC 2014 Norway, Statistics Norway.

both age groups), but the increase is lower. If we compare persons with compulsory education with persons with tertiary education, we observe an increase in the employment rate by about 27–29 percentage points for disabled people in both age groups, compared to 27.1 percentage points for non-disabled people aged 16–44 years and 12.9 percentage points in the age group 45–66 years. These rates indicate that the effect of education is substantially stronger for disabled people than for non-disabled people for persons aged 45–66 years, but not for persons aged 16–44 years. In the oldest age group, the percentage difference is about two times greater for disabled people than for non-disabled people. In the youngest age group there are only small differences between disabled and non-disabled people.

However, percentage differences tell only a part of the story. A one percentage point increase from (for example) a level of 10 per cent is quite different from a one percentage point increase from a level of 99 per cent. The increase must be compared to a reference if we wish to judge whether it is high or low. A given increase in employment by educational level will constitute a different proportional increase for disabled and non-disabled people because of the large and systematic differences in average employment rates between the groups. In addition, there are different relevant possibilities for comparisons in the table, and these will also lead to different conclusions, as we will see.

We shall first illustrate two comparisons (comparisons 1 and 2) that are common in the research literature about disability, education and employment. Comparison 1 compares the *increase* in the employment rate between two given educational levels, and comparison 2 compares the *employment rate* at given educational levels. We shall thereafter introduce a third comparison which turns things around a bit. Comparison 3 is rooted in an argument that it is of interest to measure an observed increase in employment as a proportion of the remaining distance to a situation with 'full employment', since it may be assumed that the closer you are to 'full employment' for a group, the more difficult it will be to raise the employment rate even more. While the two first interpretations are comparisons with the 'status quo' (no change) and make no specific assumptions about limits or constraints on the employment rate, the point of departure for comparison 3 is that an employment rate of 100 per cent is difficult, if not impossible, to achieve in our society for various reasons, and that the closer you get to this 'roof', the harder it is to take any further steps upwards. Thus it may be assumed that the closer a factual employment rate is to 100 per cent for a group, the more effort would be needed to increase the employment rate by a specific amount.

The lower section of **Table 3** presents the results that correspond to comparison 1, comparison 2, and comparison 3, as proportions.⁸

Comparison 1 presents the percentage differences as a proportional *increase* in the employment rate as we move from one educational level to a higher educational level. The proportions thus take into consideration the initial level of employment, and may indicate which higher educational level is most effective in increasing the employment rate compared to this initial level.

There are three possible comparisons: upper secondary compared to compulsory education; tertiary compared to upper secondary education; and tertiary compared to compulsory education. If we first focus on which upward step gives the highest proportional increase in the employment rate, we observe that this is from compulsory to upper secondary education. For disabled persons under 45 years of age, this percentage difference (21.5 percentage points) is 0.45 times the employment level of persons with compulsory education (47.3 per cent). For disabled people between 45–66 years of age, the corresponding proportion is 0.40 (14.5 percentage points increase from 36.0 per cent). For non-disabled persons under 45 years of age the largest increase is also found in the move from compulsory to upper secondary education (0.36), while this step represents a notably smaller increase for the age group 45–66 years (0.10). The last observation must be seen in light of a very high employment rate (76.8 per cent) in this age group, even for persons with only compulsory education.

Thus, also comparison 1 indicates that there is a strong positive statistical relationship between educational level and employment for both disabled and non-disabled people in which the employment rate increases for every increase in educational level. And we observe that the employment rate increases substantially more from the step between compulsory and upper secondary education than from upper secondary to tertiary education, in both age groups and for both disabled and non-disabled people. Nonetheless, the difference between disabled and non-disabled people's employment rate improvements is largest (in favour of disabled) at the step from upper secondary to tertiary education, which is therefore also the step where educational level reduces the differences in employment rates between the two groups the most.

We observe that comparison 1 results in a substantially larger difference between disabled and non-disabled people than we observed from the per cent differences. This is to some extent because disabled people have a generally lower employment rate than non-disabled people, and that a given per cent difference therefore also represents a relatively larger increase in the employment rate. We also observe that comparison 1 results in a particularly large difference between disabled and non-disabled people for those aged 45–66. In this age group the effect of education for disabled people is about four to five times the effect for non-disabled people (compared to two to three times if we compare the per cent differences). This is partly due to an initially high employment rate for non-disabled people even when they have little education. Correspondingly, since the differences in the employment rates between disabled and non-disabled people are smaller in the younger age group than in the older, the disabled/non-disabled ratio does not change so much from using the per cent differences in comparison 1.

While comparison 1 compares the *increase* (or per cent differences) in employment rates for persons with a higher education level and persons with less education, **comparison 2** compares the *employment rates*. This may look like a trivial difference, but we observe that it has important consequences for the interpretation of the differences in the effect of education on employment for disabled and non-disabled people. For instance, for the group aged 45–66 years we could observe from comparison 1 that the effect of education at the upper secondary level compared to the compulsory

⁸ Proportions can also be translated to per cent by multiplying by 100 (Hellevik 1988).

level is 3.9 (or '290 per cent higher') times as high for disabled people as for non-disabled people, while the conclusion from comparison 2 is that the corresponding effect for disabled people is only 1.3 times (or '30 per cent higher') the effect for non-disabled people. Furthermore, comparison 2 results not only in substantially smaller differences between the effect of higher education for disabled and non-disabled people, but also alters the order of which educational level has the greatest potential to decrease labour market inequalities. According to comparison 1, the step from upper secondary to tertiary education is the most effective in reducing labour market inequalities between disabled and non-disabled people, while according to comparison 2 the step from compulsory to upper secondary education is the most effective. Part of the explanation for the difference in results between comparison 1 and 2 is that comparison 2 is less sensitive to the low employment rate for disabled people with little education.

At this stage, based on comparison 1 and comparison 2, a preliminary conclusion would be that the step from compulsory education to upper secondary education has a greater effect on the employment rates than the step from upper secondary to tertiary education (for both disabled and non-disabled people), and that the effect of (any) educational level is stronger for disabled than for non-disabled people – though this is more pronounced in the older age group than in the younger age group. When we compare disabled and non-disabled people, we see that in comparison 1 the step from upper secondary to tertiary education raises the employment rate substantially *more* for disabled than for non-disabled people, while comparison 2 does not indicate such a tendency. According to comparison 2, tertiary education and secondary education have approximately the same potential to reduce labour market inequalities between disabled and non-disabled people.

Comparison 3 is based on a different logic. While comparison 1 and comparison 2 involve no theoretical assumptions about how employment rates may influence opportunities in the labour market for various social groups,⁹ comparison 3 assumes a maximum point or 'ceiling' for the employment rate, and take into account a group's position in relation to

Table 3: Increase in the employment rate by educational level and disability status. Source: EU-SILC 2014 Norway, Statistics Norway.

	16–44 years			45–66 years		
	Upper sec.	Tertiary undergrad		Upper sec.	Tertiary undergrad	
	vs Compulsory	vs Compulsory	Upper sec.	vs Compulsory	vs Compulsory	Upper sec.
Per cent differences (percentage points):						
Non-disabled	22,8%	28,9%	6,1%	8,1%	12,7%	4,7%
Disabled	21,5%	28,7%	7,2%	14,5%	27,1%	12,5%
Disabled compared to non-disabled:	0,9	1,0	1,2	1,8	2,1	2,7
Comparison 1: %-diff as proportional improvement from lower educational level:						
Non-disabled	0,36	0,46	0,07	0,10	0,17	0,06
Disabled	0,45	0,61	0,10	0,40	0,75	0,25
Disabled compared to non-disabled:	1,3	1,3	1,5	3,9	4,5	4,5
Comparison 2: employment rate as proportional improvement from lower educational level:						
Non-disabled	1,36	1,46	1,07	1,10	1,17	1,06
Disabled	1,45	1,61	1,10	1,40	1,75	1,25
Disabled compared to non-disabled:	1,1	1,1	1,0	1,3	1,5	1,2
Comparison 3: %-diff as proportional realisation of potential for «full employment» (100%):						
Non-disabled	0,62	0,78	0,43	0,35	0,55	0,31
Disabled	0,41	0,54	0,23	0,23	0,42	0,25
Disabled compared to non-disabled:	0,7	0,7	0,5	0,7	0,8	0,8

⁹ Put another way: comparisons 1 and 2 involve an implicit assumption that actual employment rates have no influence on opportunities in the labour market among different social groups.

this ceiling when interpreting the magnitude of an increase in the employment rate. Thus, changes in the employment rate by educational level are measured as proportions of the distance to an imagined situation of 'full employment' (100 per cent). An observed increase in the employment rate produced by an increase in educational level is 'weighted' against the remaining distance to 100 per cent. In the table we have therefore measured how much of the difference between the factual employment rate and a situation of 'full employment' (100 per cent) that the increases in the educational level represent for both disabled and non-disabled people in both age groups. This measurement reveals a couple of interesting insights. First, we observe that important aspects of the situation have turned the other way around compared to the two other comparisons. For every increase in educational level, the effect on the employment rate is substantially stronger for non-disabled people than for disabled people, and this holds true for both age groups. This means that a given increase in educational level reduces the remaining distance to 100 per cent employment to a higher degree for non-disabled people than for disabled people – even if the initial employment rate is substantially higher for non-disabled people than for disabled people (see **Table 2**).

In the youngest age group (16–44 years), upper secondary education increases the employment rate by 0.41 (or 41 per cent) of the remaining distance to 'full employment' for disabled people, and 0.61 (or 61 per cent) for non-disabled people. Thus, the effect of educational level for disabled people is only two-thirds (0.7) of the effect for non-disabled people. An almost identical pattern can be observed for persons 45–66 years: here too the effect of educational level for disabled people is 0.7 (or 70 per cent) of the corresponding effect for non-disabled people. According to this comparison, the effect of tertiary education for disabled people in the age group 16–44 (0.23) is only half (0.5) the size of the effect for non-disabled people (0.43).

If we focus on which educational level has the strongest effect on the chances of realising the rest of the distance to 100 per cent employment, upper secondary education is also in this case the most effective for both disabled and non-disabled people in the younger age group, while there is no corresponding difference for the older age group. It is interesting to observe that tertiary education has a substantially larger effect for non-disabled people than for disabled people – even if the employment rate for non-disabled people with secondary education is already as high as 85 per cent.

Discussion

In the preceding analysis we have studied the relationship between disability, educational level and employment rate, and in particular addressed the thesis that the effect of education on employment is twice as high for disabled people as for non-disabled people. However, the goal of the analysis has not primarily been to identify the causal effect of educational level compared to other causal factors, but to explore the relationship on the basis of different approaches to statistical comparison in cross tables. The article has also aimed to demonstrate how different choices about how and what to compare influence the interpretations and conclusions drawn from the analysis. In turn, this issue is not only a matter of methodological preferences, but is also interwoven with theoretical considerations (Hellevik 1999). The analysis has shown that choices that might seem trivial from a methodological point of view may have substantial consequences for the interpretations and conclusions about the relationship between disability, education and labour market participation. It may be argued that some of the issues are related to cross tabulation and can be bypassed by using other statistical techniques, for instance regression analysis. However, it is a fact that cross tabulations are commonly used in social studies, including in studies of disability and labour market participation, and the insights gathered through the preceding analyses should therefore be perceived as relevant. Besides, it may be argued that some of the core insights gathered in the article (particularly related to comparison 3) would not easily be discovered if cross tabulation was not used.

In summary, we have used two main approaches in the analysis of the relationship between disability, educational level and employment. The first is referred to as the 'status quo' and consists of two comparisons: comparison 1 compares the *increase* in the employment rate between different educational levels and comparison 2 compares the employment *rates*. These analyses confirm that there is a strong statistical relationship between educational level and the employment rate for disabled as well as non-disabled people, with this relationship being somewhat stronger for disabled people (as the interaction thesis predicts). But whereas research has focused on the importance of tertiary education (Tøssebro and Wik 2015; Tøssebro 2012; Molden, Wendelborg, and Tøssebro 2009; Bliksvær and Hanssen 2006; Bø and Håland 2015) in particular, the analysis in this article indicates that upper secondary education is more important. The employment rate increases substantially more between compulsory education and upper secondary education than between upper secondary and tertiary education. This is the case for both disabled and non-disabled people.

Thus when we look at what educational levels have the greatest potential to reduce inequalities in labour market participation between disabled and non-disabled people, there is an interesting difference between the younger and the older age group. In the older age group (45–66 years), the effect of education is substantially stronger for disabled people than for non-disabled people at all educational levels. In the youngest age group (16–44 years), there are only small differences between disabled and non-disabled people. Furthermore, to some extent the stronger effect of education for disabled people in the oldest age group must be explained by an initially very low employment rate for disabled people (where even a small increase in the employment rate appears large) and a high employment rate for non-disabled people (where the same increase appears much smaller).

While comparisons 1 and 2 look 'downwards' and make no assumptions about a maximum employment rate, comparison 3 looks 'upwards' and assumes a 'ceiling' ('full employment'). Comparison 3 also takes into account a group's position in relation to this ceiling when interpreting an increase in the employment rate. With this model we get a fundamentally different picture: the difference between the effect of education level on the employment rate of disabled and non-disabled people is turned almost upside down. The effect of the educational level is by far the strongest for non-disabled people, at all educational levels and for both age groups. From this point of view we cannot draw the conclusion that education reduces labour market inequalities between disabled and non-disabled people.

Thus, according to the 'status quo' model, the conclusion would be that for persons 45–66 years of age, non-disabled people's participation in the labour market is clearly less dependent on education than is the case for disabled people. In other words, non-disabled people have a high employment rate almost irrespective of education. However, from comparison 3 we can tell that this apparently limited effect of education for non-disabled people is in reality very strong if one takes into consideration that this group is already close to 'full employment'.

Concluding remarks

The impact of educational level on participation in the labour market has become a key idea within policy and research on disability and inclusion. It has attracted interest not least because of the observed statistical interaction indicating that educational level has a stronger positive effect for disabled people than for non-disabled people. This has the important practical implication that education can be a potentially effective means of diminishing inequalities between disabled and non-disabled people in the labour market. However, the results of the analysis in this article illustrate that the answer to this problem may not be so clear, and that the link depends on, among other things, the theoretical assumptions that are made about the mechanisms in the labour market and that guide the analyses. The article also suggests that caution may be needed regarding the consistent claim in Nordic disability policy that higher education is the main route to reduced inequalities and greater societal inclusion for disabled people.

Competing Interests

The author has no competing interests to declare.

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