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At the crossroads: the interaction of demographic factors in persons with disabilities in employment outcomes

Social Policy and Public Health
Master's Thesis Based on Existing Data

Name: Tiffany Lo
Student number: 6754465
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Supervisor: Dr. Marcel Hoogenboom

Abstract

People with disabilities (PWD) are half as likely to be employed than those without. In addition to disability, it is well established that demographic factors can also affect employment outcomes. Despite this, the interactions between disability and demographic factors have not been investigated. The question this study seeks to answer is: how does disability, together with demographic factors, affect employment status? This is done by first confirming that age, gender, education and disability affect employment. Next, we tested whether the effect of disability on employment is moderated by demographic factors. Finally, we tested whether demographic factors interacted with each other to impact the employment outcomes of PWD to reveal particularly disadvantaged subgroups in the PWD population. Data from the 2018 European Social Survey featuring 36015 responses from 20 countries was analyzed with chi square analyses and binomial logistic regression. Our results showed that disability, age, gender and education all affect employment outcomes. Significant interactions were found between gender and disability, age and disability, and education and disability. A small number of interactions effects between age and education were found to impact employment outcomes of PWD, but no particularly disadvantaged subgroups were revealed. By finding significant interaction effects, our study supports the notion of dynamic interplay between demographic group memberships. This has implications for both research and policy. In terms of policies, it suggests that employment policies that address disability and demographic factors individually in a 'blanket' way may not suffice. In terms of research, our results suggest that more attention should be paid to the interactions between demographic factors, rather than being considered and tested individually.

Introduction

The subject of employment has a marked impact on the social and economic situation of the society and individual and demands a lot of attention from politicians, policy-makers and private organisations alike. Before the onset of the new coronavirus (COVID-19), the European Union (EU) experienced its lowest rate of unemployment this century: 73.1% of the EU population aged between 20 and 64 in were employed in 2019 (Eurostat, 2020). Despite these improvements, people with disabilities (PWD) remain underrepresented in employment – people with disabilities are half as likely to be employed than people without disabilities[1] . This gap persists despite demonstrated benefits of hiring PWD for both the employer (Hartnett, Stuart, Thurman, Loy, & Batiste, 2011) and the disabled person (Waddell, & Burton, 2006).

PWD are a diverse group, not only is there diversity in the type and severity of the disability itself, but also in the disabled persons' demographic profile. In the book *Counting Working-Age People with Disabilities*, Houtenville (2009) argues the importance of a systematic overview of the disabled, working-age population – a population that is currently relatively understudied in terms of employment status compared to other demographic breakdowns. While Houtenville's analysis was based on the United States of America (US), the situation is similar in Europe. The European Labour Force Survey (EU-LFS), which aims to be the key source of information regarding the European labour market, reports mainly on employment trends based on demographics such as age and gender, gathering this information on a monthly basis, and by contrast, only holds an ad-hoc module on disabilities once a decade. Moreover, research that looks into the issues PWD face in employment tend to either consider the disabled population as one, generalized group (Hartnett et al., 2011) or has a narrow scope of one particular disability

[1] Calculated from Eurostat, 2015

type with little attention paid to the impact or interaction of demographic factors (Unger, 2002; Noonan, Gallor, Hensler-Mcginnis, Fassinger, Wang, & Goodman, 2004).

It has been well established that a person's demographics, such as their age, gender and educational attainment can impact their employment status. In Europe, youth unemployment has historically been higher than the unemployment rate of the general population. Female unemployment rates also tend to be higher than male unemployment rates ("Unemployment statistics", 2019). Not only might demographic factors impact employment status, it is also possible that they can interact with one another to create a combined effect that impacts employment status in a different way than their individual effects do. The theory of intersectionality, popularised by Crenshaw (1989), further develops the discourse on the impact of demographic factors by suggesting that social and political identities, and their social environment interact with one another to form a separate, unique phenomena. This contrasts with the previous, more general, umbrella-like approach to considering demographic factors. An important element of intersectionality research is to recognise the within-group diversity and look at the dynamic interaction between individual and institutional factors (Hancock, 2007). The idea of intersectionality has had a marked impact on the discourse of law and policy-making and is increasingly considered in psychological, sociological and political research (Hancock, 2007; Bose, 2012).

The aim of the current study is gain further insight into the employment gap in PWD in Europe by investigating the impact and interaction of the demographic factors age, gender and education with disability on employment. Furthermore, the study seeks to identify PWD subgroups that are particularly disadvantaged when it comes to employment. The importance of research and statistics on PWD has been well-established. Despite this, the difficulties including

PWD in employment remain understudied relative to other vulnerable demographic groups (Houtenville, 2009). Little research or statistical analysis has been conducted to investigate the impact and interaction of demographic factors on people with disabilities in gaining employment, particularly in Europe. By dissecting such a diverse group as PWD, the findings of this study will offer a clearer picture of the variability of employment status in the PWD population and identify the demographic factors that may moderate a PWD's employment status. This contributes to the scientific body of work by providing contextual support and justification for more focused employment studies of PWD subgroups, such as qualitative to understand these barriers either from the employer's perspective, or the experiences of the disabled population. The analysis of the main effects and interactions from census data can also contribute to the developing intersectionality approach to research and policy.

Employment has socio-economic impacts on the society and the individual (Kapp, 1975). For example, people who are employed have less risk of poverty (Eurostat, 2020). At the same time, the subject of disability has shifted from a medical focus to a social and human-rights issue championed by the "Independent Living Movement" disabilities activists over the past half-century (Barnes & Mercer, 2005). Therefore, the issue of PWD employment is of great social relevance. Identifying which subgroups experience the most difficulty in gaining employment also sheds light on the groups that need the most attention from future research and policies. Subsequently, it is important for us to understand the difficulties PWD face in our society, to navigate the diversity between PWD subgroups, in order to effect changes that can improve their experiences and inclusion.

Theoretical Framework and Existing Research

Employment

Economic theories on employment tend to focus on the aspect of monetary transactions or capital exchanges between the employer and employee, and the implications these have on the economy as a whole. As summarized by Simon (1951), in an employment relationship, employees offer their labour, as a means of production, to the employer in exchange for wages. Simon (1951) elaborates further by differentiating the employment contract from a sales contract. It is suggested that the employment contract covers a longer, more indefinite period, whereby the employer has authority over the actions and performance of the employee. To this extent, there is a degree of uncertainty for the employee over what the work will entail at the time of agreeing to the employment contract, and therefore, increased wages are a tool to compensate for the uncertainty of the situation. In the same vein, Bodie (2013), from a legal perspective, also notes the significance of the element of control as a key, traditional determinant of employment relationships. The control that the employer has over the employee has implications towards the employers' liability and responsibility over the employees' actions during their hours of service. From a more macro perspective, John M. Keynes, in his heavily influential and much debated "The General Theory of Employment" (1937) portrayed employment as a tool to stimulate production and economic growth particularly in times of economic depression. The ideas brought forward by Keynesian economics were to inspire the social investment approach to welfare, which in turn partly inspire active labour market policies encouraging participation.

The legal definition of employment is also important as a foundation upon which lawmakers determine rights and create policies to protect the laborers against exploitation such as discrimination, unreasonable compensation, or dangerous working conditions (Bodie, 2013). Due to the complex legal implications, employment relationships can be difficult to define, sometimes resulting in dubious, circular definitions. Bodie (2013), for example, notes the US 1974 Employee Retirement Security Act's (ERISA) "definition of 'employee' is 'any individual employed by an employer,'" (p.678). One might interpret that as meaning that a worker is only considered an employee if the employer decides this is the case. This may become an issue with today's up-rise of the 'gig-economy' disrupting the traditional employment relationship by introducing short-term 'micro-contracts' to anyone willing to perform the tasks, but are considered by the company to be employees.

Highlighting the shifting nature of the economy and the increased diversity of working arrangements, Bodie (2013) suggests that participation should be considered a determinant of employment status to prevent enterprises from using misleading terms to escape the legal consequences of employment. This participation theory tests the level of participation in a firm's economic activities to determine the employment relationship. This definition recognizes a wider variety of arrangements as employment, but requires more careful considerations to distinguish employment arrangements from non-employment arrangements. Despite progressing towards more open and inclusive approach as presented by Bodie (2013), the legal approach to defining employment is too fastidious for the purpose of this study. The key elements highlighted by the economic approach, such as the exchange of labour capital for monetary compensation and its larger effects on the economy and society are the most relevant to this study. Therefore, the economic approach to defining employment, as presented by Simon (1951), will lead.

Disability

In exploring the shifts in the meaning of disability, Ville (2010) suggested that the idea of disability originated from being unfit for work. At the time when labour was predominantly physical, disability was therefore linked to physical capacity. The incapacity to work was subsequently linked to a right to assistance. Ville notes that an important shift in the idea of disability came with seeing disability as "recoverable" or "re-adaptable". A focus on rehabilitation of the disabled came as a result – enabling disabled people, at the time often a result from war, to return to their former lives, including work. Ville further suggests that the most recent shift sees disability as a reflexive construct – an interaction between the individual's self-identity and their surrounding social cognition.

Bertrand, Caradec and Eideliman (2014) observes a different shift from the individual model of disability to the social model of disability. The individual or medical model views disability as a product of an internal "malfunction" of the individual when compared to a "normal" person. In applying this model, the focus becomes "normalizing" the person with disability either with tools, aid or treatment to become more like a person without. By contrast, the social model of disability recognizes the social and systematic processes that marginalize or create disadvantages for the persons with disability (Barnes & Mercer, 2005). The focus then shifts from medical care and rehabilitation for PWD to understanding, changing and removing obstacles from the social context of PWD across different levels and life spheres: accessibility to transport, education, suitable work environments, and their overarching policies.

Both approaches the individual and social model have their strengths and weaknesses, as a result, Bertrand et al. (2014) suggests an intermediary position, for example, the International Classification of Functioning, Disability and Health (ICF) model developed by the World Health

Organization. The ICF model takes into account: impairment – a loss of sensory, physical or mental body function or structure; activity limitation – difficulty in executing everyday activities; and participation restriction – difficulty in getting involved in societal or life activities (WHO, 2002). The ICF model incorporates key elements of both the social and medical model of disability and has been developed to consider a wide range of applications and will therefore lead in this study.

Demographic Factors, Interaction, and Intersectionality

Demography is the statistical study of a human population. Demographics are the characteristics that help define the population. The characteristics of focus can vary depending on the study, but the most common are age, gender, race, ethnicity, religion, household income, education, marital status (Schuele & Lee, 2014). Demographic variables are generally understood to influence outcomes. As a result, demographic data is often collected to either analyse as part of the study or to control for. In order to perform the intended analyses of this study, logistic regression, there needs to be sufficient incidences for all possible combinations of explanatory variables, thereby limiting the demographic characteristics and the number of categories that can be included within the analysis. The demographic factors selected for this study are age, gender and education. These demographic variables are often linked to employment outcomes (Eurostat, 2020), along with ethnicity (Krause & Anson, 1996; Sevak, Houtenville, Brucker, & O'Neill, 2015; Moore, Feist-Price & Alston, 2002). However, the study samples the European population in 30 countries, all with unique ethnic compositions, the resulting number of ethnic subgroups are not suitable for the analysis method, thus ethnicity has been excluded from the study.

Despite ample evidence for disability gap in employment, and demographic factors impacting employment outcomes, few studies have combined the two concepts to understand employment outcomes in the PWD population by demographic factors. A survey for a policy brief on the social and employment situation of PWD in Europe found differences between demographic groups such as age, gender and education levels within the PWD community (Ahrendt, 2018). However, the differences between groups were not tested statistically. Jang, Wang and Lin (2013) conducted a comprehensive study the impact of demographic factors, work experience and use of disability employment services on the disabled population in Taiwan. Moore, Harding, Clarkson, Pickersgill, Wardle, and Robertson (2013) studied the effect of demographic and disease factors on changes in employment in 221 patients diagnosed with multiple sclerosis in the United Kingdom (UK). Sevak et al. (2015) compared the employment rates between respondents with and without disabilities of the 2009-2011 American Community Survey across demographic variables. Moore et al. (2002) studied the predictive value of gender, race, secondary psychiatric disability and rehabilitative trainings on employment status and income in people with mild and moderate mental retardation in the United States of America. Krause and Anson (1996) studied the different reasons for unemployment in different demographic groups of patients suffering from spinal cord injuries and found an interaction between gender and race, and between age and level of injury on the difficulties reported.

The findings of the studies will be summarized by variables below. Overall, there is some evidence to suggest that demographic factors may interact with disability to impact employment outcomes, but few studies have tested the interactions between demographic variables in the PWD population.

Gender, Disability and Employment

European employment data shows a higher unemployment rate overall in women than in men in the general population ("Unemployment statistics", 2019). Sevak et al. (2015) reported a slightly smaller employment gap between women with and without disabilities than between men with and without disabilities, with men having an overall higher employment rate than women for both disabled and non-disabled groups. Ahrendt (2018), also noted a slightly smaller disability employment gap between women than men in Europe. Other studies on PWD did not find a significant effect of gender on employment outcomes in PWD (Jang et al., 2013; Moore et al., 2002; Moore et al., 2013). Krause and Anson (1996) reported that female and male sufferers of spinal cord injuries reported different reasons for not working. Overall, the evidence suggests that may not be an effect of gender on the employment status of PWD, but suggest that gender and disability interact.

Age, Disability and Employment

Jang et al. (2013) found a significant effect of age and employment outcomes for PWD in Taiwan, with employment rates decreasing as age increases. Age was also found to have a significant effect on employment changes in patients diagnosed with multiple sclerosis in the UK (Moore et al., 2013). In the US, employment rates decreased by age for both people with and without disabilities, but the disability employment gap was larger between the ages of 30-59 (Sevak et al., 2015), suggesting a possible interaction between age and disability. Age had a significant effect on the reported reasons for not working in patients with spinal cord injuries, older participants reported significantly more physical and health related concerns (Krause & Anson, 1996). A much larger disabled employment gap for ages 35-64, compared to 15-34 is also noted in Europe (Ahrendt, 2018). These findings contrast from general population of

Europe, where youth unemployment has been historically higher ("Unemployment statistics", 2019). Overall, evidence suggests that employment rates decrease with age for the general population, while Europe may additionally have lower employment rates with youth. The employment gap in higher ages appears more pronounced in PWD, suggesting that age and disability interact.

Education, Disability and Employment

Higher education levels of college or above were associated with better employment outcomes for PWD (Jang et al., 2013). Years of education was a significant predictor of employment outcomes in patients diagnosed with multiple sclerosis (Moore et al., 2013). In Europe, people with a higher education also have better employment outcomes ("Unemployment statistics", 2019). Other studies have also found that the employment gap between the disabled and non-disabled narrowed with higher educated participants (Sevak et al., 2015; Ahrendt, 2018). This evidence suggests that education positively impacts employment status overall and may interact with disabilities to improve employment outcomes for PWD.

Research Questions

The overarching research question this study seeks to answer is: how does disability, together with demographic factors, affect employment status? This is further broken down into sub-questions:

Firstly, we would like to confirm that disability and the demographic variables affect employment status, by asking: how do gender, age, education disability affect employment status? (See Fig. 1).

Hypothesis Ia. The extent of a person's disability negatively affects their employment status.

Hypothesis Ib. Women are less likely to be employed than men.

Hypothesis Ic. The youngest and oldest age groups are less likely to be employed.

Hypothesis Id. A person's education level affects their employment status.

Secondly, we seek to understand their combined effects by asking: does gender, age and education, moderate the effect of disability on employment status? (See Fig. 2).

Hypothesis IIa. Gender moderates the effect of disability on employment status.

Hypothesis IIb. Age moderates the effect of disability on employment status.

Hypothesis IIc. Education moderates the effect of disability on employment status.

Finally, we go one step further to test whether the demographic variables interact with each other to affect employment status in PWD. This will help us identify whether certain subgroups within the PWD struggle especially with finding work. How do the effects of gender, age and education, interact with each other to affect employment status in PWD? (See Fig. 3).

Hypothesis IIIa. The effects of gender and age will interact with each other to impact employment status in PWD.

Hypothesis IIIb. The effects of gender and education will interact with each other to impact employment status in PWD.

Hypothesis IIIc. The effects of age and education will interact with each other to impact employment status in PWD.

Figure 1.

Main effects of disability and demographic factors on employment

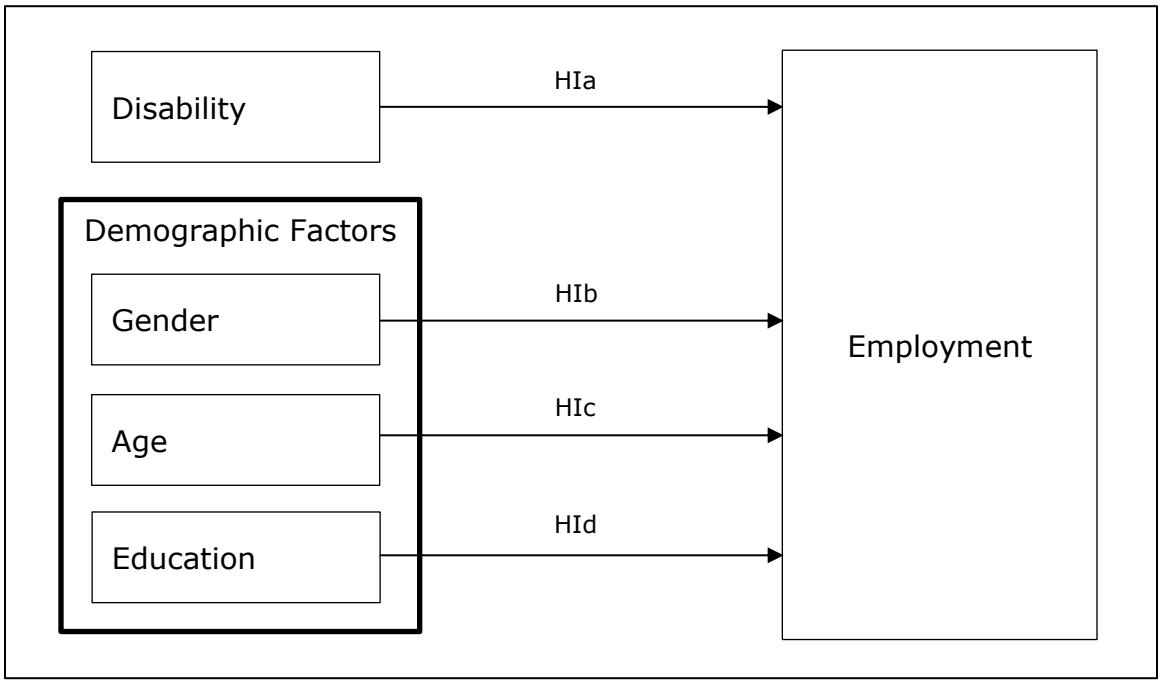


Figure 2.

Moderating effects of demographic factors on disability and employment

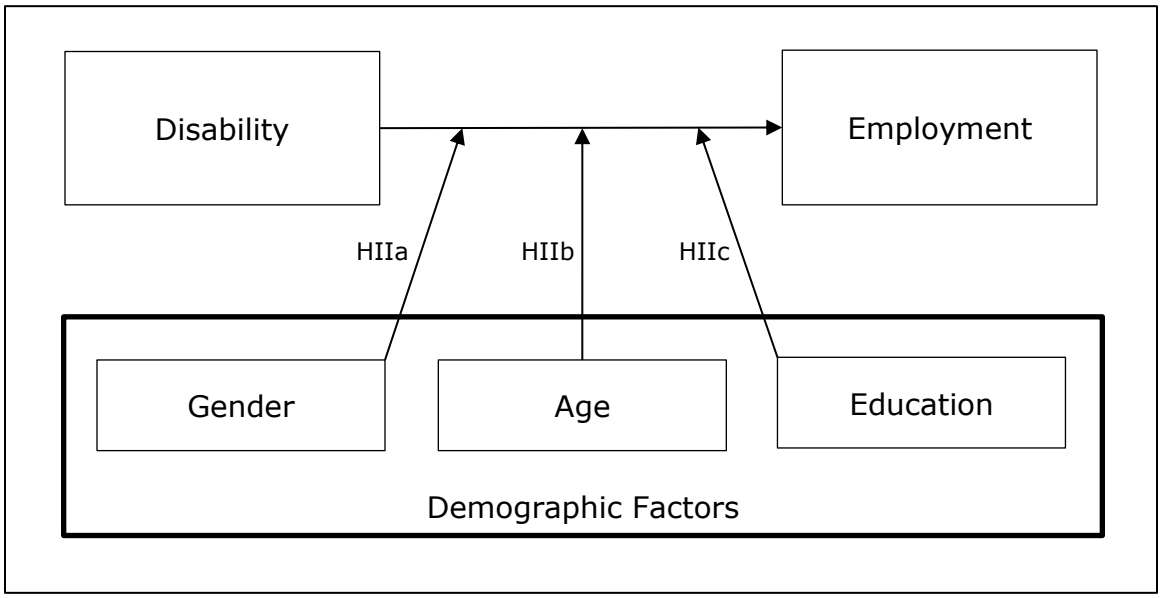
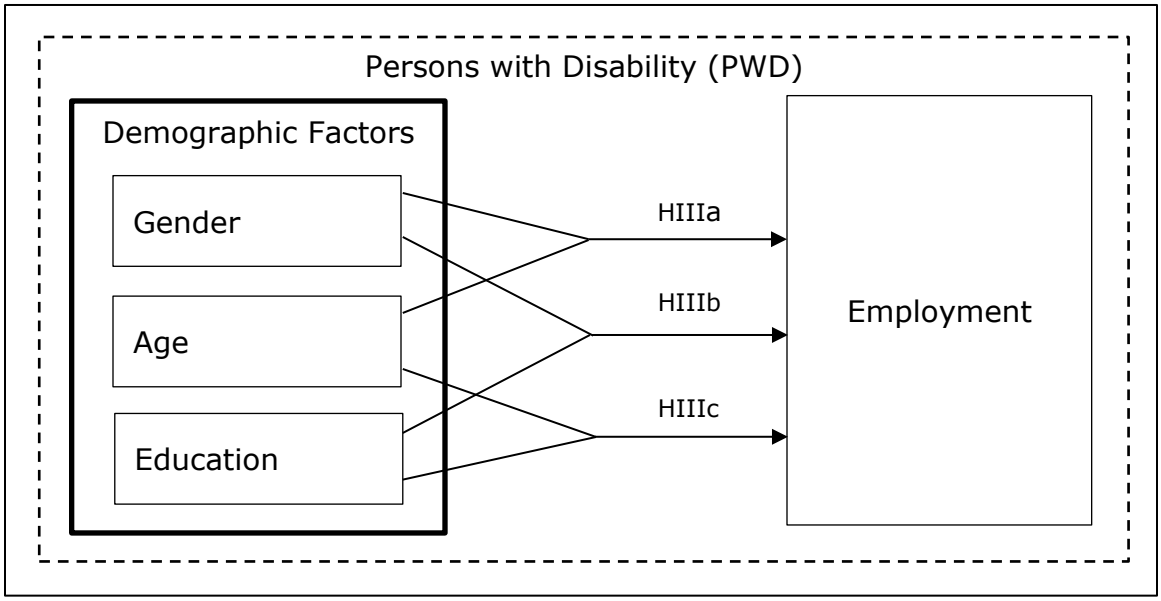


Figure 3.

Interaction effect of demographic factors on employment in PWD



Methodology

The goal of this research is to understand the issue of unemployment for PWD by demographic factors. The theories that demographic variables and disability can affect employment are mature in their development and have been demonstrated many times previously (Jang et al. 2013; Moore et al., 2002; Moore et al., 2013; Krause & Anson, 1996). Therefore, a quantitative method with a large sample size was used to statistically test the relationship between these demographic variables and a person's disability on their employment status. Existing data from the 2018 round of the European Social Survey (ESS) was used in this study. The European Social Survey is a biennial, cross-national survey to measure the changes in attitudes and values in Europe. It has been recognized for its quality (Sevak et al., 2015) and was the 2020 winner of the Lijphart/Przeworski/Verba Dataset Award. Access to the data is open to the public free of charge, thereby making it a cost-effective and robust dataset for this study.

Participants

Out of 30 participating countries in the ninth round, data from 20 countries totaling 36015 participants was available in the first release of the data: Austria, Belgium, Bulgaria, Cyprus, Czechia, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Serbia, Slovenia, Switzerland and United Kingdom. Individuals were selected by random probability sampling methods from a universe of all persons aged 15 and above, residing within private households, regardless of their nationality, citizenship, language or legal status. Considering retirement age, participants above the age of 65 were excluded in this study. Any cases where the participant refused to answer or did not know were excluded from the analysis. Any cases where a participants' education could not be harmonized to the ESS ISCED scale were also excluded.

Procedures

Survey organisations were selected by the national funding agency according to the ESS specification. Survey organisations devised their own sampling strategies in accordance to the ESS Survey Specification which was then reviewed and approved of by the ESS Sampling Expert Panel. Quota sampling and substitutions of non-responding individuals or households are not permitted.

The data analyzed in this study was collected between September 2018 to the end of 2019. Interviewers were briefed prior to the fieldwork process in face-to-face sessions. Interviewers made four attempts to contact participants, including one attempt in the evening and during the weekend. Interviews were held face-to-face.

Materials

The survey consisted of eight modules and takes approximately 55 minutes when administered in British English. Surveys were developed in British English and subsequently translated the native languages of 5% of any country's population.

Employment

Employment was determined by the question: "Using this card, which of these descriptions applies to what you have been doing for the last 7 days? Select all that apply." With an additional prompt: "Which others?" Participants could select any options that applied to them: in paid work (or away temporarily) (employee, self-employed, working for your family business) (01); in education, (not paid for by employer) even if on vacation (02); unemployed and actively looking for a job (03); unemployed, wanting a job but not actively looking for a job (04); permanently sick or disabled (05); retired (06); in community or military service (07); doing housework, looking after children or other persons (08); other (09). Missing responses included: refusal (77) and don't know (88). If 'in paid work' was not selected, participants were asked a follow-up question: "Can I just check, did you do any paid work of an hour or more in the last seven days?" Answers were coded into: yes (1), no (2), refusal (7) or don't know (8). For this study, the answers to both these questions were combined into one variable for paid work.

Disability

Disability was determined by the question: "Are you hampered in your daily activities in any way by any longstanding illness, or disability, infirmity or mental health problem?", and the follow-up question: "If yes, is that a lot or to some extent?" 'Hampered' is defined in the ESS Round 9 Source Questionnaire (2018) as: "limited, restricted in your daily activities".

Participants' responses were coded into: yes a lot (1), yes to some extent (2), no (3), refusal (7) or don't know (8).

Gender

Demographic information was collected for the participant and all members of the household. No explicit question was specified in the ESS Round 9 Source Questionnaire (2018) to determine gender. Interviewers were simply instructed to 'code sex' into: male (1), female (2) or no answer (9).

Age

Participants were asked for their year of birth, their age was then calculated from the year of birth. For this study, age was then categorized into age groups: 15-24 (1), 25-34 (2), 35-44 (3), 45-54 (4), 55-64 (5) or 65+ (6). The age groups were then re-ordered according to employment rate for the logistic regression: 45-54 (1), 35-44 (2), 55-64 (3), 25-34 (4) and 15-24 (5).

Education Level

Education level was determined by the question: "What is the highest level of education you have successfully completed? Please use this card." Country-specific levels were used in the interview then harmonized into the ESS Education Detailed ISCED Coding Frame. For this study, education level was further re-coded into four levels: ISCED 1 less than lower secondary education, ISCED 2 lower secondary or ISCED 3 upper secondary education level completed, ISCED 4 post-secondary non-tertiary education completed, ISCED 5A Bachelor education completed, and ISCED 5A Master degree or ISCED 6 doctoral degree completed.

Data Analysis

SPSS Statistics 25 was used to perform the statistical analyses. Design weights and population size weights were applied according to "Weighting European Social Survey Data" (2014). After recoding the variables and running frequencies, the sample was tested to see if it met the assumptions for binary logistic regression. Next, the relationships between each of the dependent variables: disability, age, gender and education level, and the independent variable employment status were tested using chi square analyses. To further understand the effects of and interactions between the dependent variables, three binomial logistic regression models were built with the full sample: (1) testing the main effects of disability, age, gender and education level only, (2) testing the main effects of the dependent variables and interaction effects between disability and the other demographic variables, (3) testing the main effects and all interactions. Each model was run with 20 iterations, confidence intervals of 95%, standardized residuals, and indicator contrasts. Not hampered males, aged 45 to 54 with less than lower secondary education were the comparison group. To test hypotheses IIIa, IIIb and IIIc, the subgroups 'hampered a lot' and 'hampered to some extent' were combined into one disabled population, to test the effects and interactions of age, gender and education. For this, the comparison group was males aged 45 to 54 with less than lower secondary education. Except for education level, comparison groups were chosen based on the subgroups with the highest employment rate. Less than lower secondary education was used as the comparison group to analyse the effect of increasing education.

Results

To check whether the weighted sample was representative of the European population, we use EU28 census data compiled by the European Statistics Office (Eurostat). After design

and population size weights were applied to the data, 4.5% of the valid sample were hampered a lot and 15.1% were hampered to some extent, making a total of 19.6% of the weighted sample hampered or disabled in some way. Unweighted data from the 2011 European Labour Force Survey (2019) from EU28 countries found 14.5% of participants answered that they had 'difficulty in basic activities'. 51.6% of the sample in this study was female, EU28 census data estimates the female population to be at 51.1% of the total population. In terms of education, data from Eurostat (2020) found that 24.9% of the population completed less than primary, primary and lower secondary education, 45.6% upper secondary, post-secondary non-tertiary education, and 29.5% tertiary education. When the sample from this study is realigned according to these categories, the respective percentages are: 25.5%, 50.9% and 22.1% respectively. In terms of age groups, EU 28 census data from Eurostat (2020) represents the population aged 0-14 at 15.5%, 15-24 at 10.7%, 25-49 at 33.2%, 50-64 at 20.5%, 65+ at 20%. Our sample, which does not include anyone aged under 15, when aligned with this grouping, is distributed as follows: 11.8% aged 15-24, 36.6% aged 25-49, 26.5% aged 50-65, 25% aged above 65. The comparison suggests that our sample may be slightly overrepresented in the disabled, post-secondary non-tertiary educated or aged 50-65 populations, but should be otherwise generally representative.

Table 1.

Descriptive Statistics of Variables after Weighting

Responses	Frequency	Percent	Valid Percent
Disability			
Hampered a lot	1163	4.4%	4.5%
Hampered to some extent	3929	15%	15.1%
Not hampered	20993	80.3%	80.5%
Refusal	30	0.1%	
Don't know	14	0.1%	
No answer	4	0%	
Total	26132	100%	
Gender			
Male	12654	48.4%	48.4%
Female	13478	51.6%	51.6%
Total	26132	100%	100%
Education Level			
Less than lower secondary education (ISCED 0-1)	1105	4.2%	4.3%
Lower or upper secondary education completed (ISCED 2-3)	14618	55.9%	56.5%
Post-secondary, below bachelor education completed (ISCED 4-5)	3522	13.5%	13.6%
Bachelor tertiary education completed (ISCED 6)	2706	10.4%	10.5%
Master or doctoral degree completed	3922	15%	15.2%
Not possible to harmonise into 5-level ISCED	86	0.3%	
Other	84	0.3%	
Refusal	57	0.2%	
Dont know	30	0.1%	
No answer	2	0%	
Total	26132	100%	
Age Group			
15-24	4122	11.8%	15.8%
25-34	4569	13.1%	17.5%
35-44	5218	14.9%	20%
45-54	6099	17.4%	23.3%
55-64	6124	17.5%	23.4%
Not available	126	0.4%	
Total	26132	100%	100%

According to Field (2009), in addition to a binary outcome, there are three assumptions for logistic regression: linearity, which assumes that any continuous predictors have a linear relationship with the logit of the outcome variable; independence of errors, which assumes that cases are not related; and multicollinearity, which assumes predictors are not highly correlated to each other. In this study, all predictor variables were categorical, and thus linearity did not apply. To ensure independence of errors, only data from one survey round was used, and the data from only the main respondent per household was included in this study. To test for any correlation between the dependent variables, all of which were categorical, chi square analyses were performed (See Table 2). There was no significant association between disability and gender ($p = .185$). Although statistically significant, the associations between gender and education ($\varphi = .024$, $p = .006$), and gender and age ($\varphi = .024$, $p = .004$) were very weak; and there were low associations between disability and age ($\varphi = .191$, $p < .001$), disability and education ($\varphi = .117$, $p < .001$), and education and age ($\varphi = .269$, $p < .001$).

Table 2.

Chi Square Analyses for Multicollinearity

Variables		χ^2	*df*	N	*p*	φ	Cramer's V
Disability	Age	947.966	8	26084	<.001*	.191	.135
Disability	Gender	3.380	3	26085	.185	.011	.185
Disability	Education	352.786	8	25828	<.001*	.117	.083
Education	Gender	14.392	4	25872	.006*	.024	.024
Education	Age	1867.712	16	25874	<.001*	.269	.134
Gender	Age	15.282	4	26132	.004*	.024	.024

*Note: *p* < .05*

The main analysis began by testing the effect of disability and demographic variables on employment status. This was done by chi square analyses, and by binomial logistic regression. The first binomial logistic regression model tested the main effects of disability, gender, age and education on employment, and found a significant associations ($\chi2(11) = 4872.873$, $p < .001$.)

Hypothesis Ia: the extent of a person's disability negatively affects their employment status.

Chi square analysis found significant but low associations between extent of disability and employment status (χ^2 (2, N=26086) =792.345, $p < .001$; $\varphi = .174$, Cramer's V = .174). When only the main effects of disability and demographic variables were tested, disability had a significant, negative effect on employment. For those that are 'hampered a lot', we expect the logit to change by -1.768 (SE = .069, $p < .001$) and for those 'hampered to some extent', a logit change of -.411 (SE = .042, $p < .001$), holding demographic variables constant (See Table 3). Based on this, hypothesis Ia is accepted.

Hypothesis Ib: women are less likely to be employed than men.

Chi square analysis found significant but low associations between gender and employment status (χ^2 (1, N=26132) =267.787, $p < .001$; $\varphi = -.101$, Cramer's V = .101) In the regression analysis of main effects, gender had a significant ($p <.001$), negative effect on employment. For

females, we expect the logit to change by -.606, holding demographic variables constant (See Table 3). Hypothesis Ib is accepted.

Hypothesis Ic: the youngest and oldest age groups are less likely to be employed.

Chi square analysis found significant, moderate associations between age groups and employment status (χ^2 (4, N=26132) =3189.225, $p < .001$; $\varphi = .349$, Cramer's V = .349). The logit changes compared to the age group with the highest employment rate, 45-54, were significant and negative, but relatively small for age groups 35-44 (B = -.146, SE = .054, p = .007) and 25-34 (B = -.581, SE = .053, $p < .001$), and larger for age groups 55-64 (B = -1.124, SE = .047, $p < .001$) and 15-24 (B = -2.143, SE = .051, $p < .001$), holding demographic variables constant. Hypothesis Ic is accepted.

Hypothesis Id: a person's education level affects their employment status.

Chi square analysis found significant, low-to-moderate associations between education level and employment status (χ^2 (7, N=25873) =2221.203, $p < .001$; $\varphi = .293$, Cramer's V = .293). Table 3 shows the logit changes of increasing levels of education. The logit changes were significant and positive, but relatively small for completing lower or upper secondary education (B=.644, SE = .070, $p < .001$), and larger, but similar for post-secondary, below bachelor education (B = 1.313, SE = .081, $p < .001$), bachelor education (B= 1.286, SE = .086, $p < .001$), and master or doctoral degrees (B= 1.464, SE = .083, $p < .001$), holding demographic variables constant. Hypothesis Id is therefore accepted.

Table 3.

Analysis of maximum likelihood and odds ratio estimates for disability, age, gender and education

	Maximum likelihood estimates					95% CI for Odds Ratio		
Parameter	***df***	**B**	**S.E.**	**Wald χ2**	***p***	**Parameter**	**Odds Ratio**	**Lower**	**Upper**
Constant	1	1.382	.079	307.941	<.001*		3.983		
Disability				696.876					
Hampered a lot	1	-1.768	.069	655.097	<.001*	vs. not hampered	.171	.149	.195
Hampered to some extent	1	-.411	.042	97.169	<.001*	vs. not hampered	.663	.611	.719
Gender: female	1	-.606	.031	379.175	<.001*	vs. male	.545	.513	.580
Age group				2386.736					
35-44	1	-.146	.054	7.264	.007*	vs. 45-54	.864	.777	.961
55-64	1	-1.124	.047	581.217	<.001*	vs. 45-54	.325	.297	.356
25-34	1	-.581	.053	119.511	<.001*	vs. 45-54	.559	.504	.621
15-24	1	-2.143	.051	1779.061	<.001*	vs. 45-54	.117	.106	.130
Education				589.555					
Lower or upper secondary education completed	1	.644	.070	85.035	<.001*	vs. Less than lower secondary education	1.905	1.661	2.185
Post-secondary, below bachelor education completed	1	1.313	.081	260.413	<.001*	vs. Less than lower secondary education	3.719	3.170	4.362
Bachelor education completed	1	1.286	.086	225.121	<.001*	vs. Less than lower secondary education	3.619	3.060	4.282
Master or doctoral degree	1	1.464	.083	309.302	<.001*	vs. Less than lower secondary education	4.322	3.672	5.088

Note. R^2 = .158 (Hosmer & Lemeshow), .177 (Cox & Snell), .264 (Nagelkerke). Model $\chi2(11) = 4872.873$, $p < .001$.
*$p < .05$

Next, we investigated whether the effect of disability on employment status was moderated by demographic variables. In a regression model which included all possible two-way interactions in addition to the main effects of disability and demographic variables, the effect of disability remained significant and negative, but the negative logit change became larger than when only the main effects were tested. For those that are 'hampered a lot', the logit change became -3.198 (SE = .307, $p < .001$) and for those 'hampered to some extent', a logit change became -1.314 (SE = .193, $p < .001$), holding demographic variables and interactions constant. This suggests that the effect of disability is moderated by one or more of the demographic variables (see Table 4).

Hypothesis IIa: gender moderates the effect of disability on employment status.

A significant, positive interaction effect was found for both female * hampered a lot (B = .51, SE = .137, $p < .001$) and female * hampered to some extent (B = .481, SE = .084, $p < .001$). Logit change of both interactions are in the opposite direction to the main effects of being female (B = -1.118, SE = .159, $p < .001$), hampered a lot and hampered to some extent which were all significant and negative. We therefore accept hypothesis IIa.

Hypothesis IIb: age moderates the effect of disability on employment status.

When testing interactions in addition to main effects, the logit changes associated with the different age groups were still significant for all age groups except for 25-34 (B = -.007, SE = . 276, p =.979). All possible interactions between age groups and extent of disability were significant and positive. It is noteworthy that the logit changes of interactions involving the group 'hampered a lot' were larger than 'hampered to some extent' (see Table 4). We therefore accept hypothesis IIb.

Hypothesis IIc: education moderates the effect of disability on employment status.

Only one significant interaction was found between education and disability: a significant, positive logit change for bachelor's education completed * hampered a lot (B = .973, SE = .383, p = .011). All other possible interactions were insignificant (see Table 4). Hypothesis IIc is accepted, but only in the specific case of 'bachelor's education' and 'hampered a lot'.

Table 4.

Analysis of maximum likelihood and odds ratio estimates for disability, age, gender and education and interaction effects

	Maximum likelihood estimates					95% CI for Odds Ratio			
Parameter	***df***	**B**	**S.E.**	**Wald χ2**	***p***	**Parameter**	**Odds Ratio**	**Lower**	**Upper**
Constant	1	1.253	0.204	37.608	<0.001*		3.502		
Disability	2			132.575	<0.001*				
Hampered a lot	1	-3.198	0.307	108.497	<0.001*	vs. not hampered	0.041	0.022	0.075
Hampered to some extent	1	-1.314	0.193	46.604	<0.001*	vs. not hampered	0.269	0.184	0.392
Gender: female	1	-1.118	0.159	49.427	<0.001*	vs. male	0.327	0.239	0.446
Age group	4			148.166	<0.001*				
35-44	1	0.556	0.268	4.29	0.038*	vs. 45-54	1.743	1.03	2.949
55-64	1	-0.635	0.221	8.264	0.004*	vs. 45-54	0.53	0.344	0.817
25-34	1	0.007	0.276	0.001	0.979	vs. 45-54	1.007	0.586	1.73
15-24	1	-1.894	0.227	69.845	<0.001*	vs. 45-54	0.15	0.096	0.235
Education	4			114.477	<0.001*				
Lower or upper secondary education completed	1	1.134	0.204	30.876	<0.001*	vs. Less than lower secondary education	3.108	2.083	4.636
Post-secondary, below bachelor education completed	1	2.129	0.242	77.401	<0.001*	vs. Less than lower secondary education	8.405	5.231	13.505
Bachelor education completed	1	1.697	0.26	42.752	<0.001*	vs. Less than lower secondary education	5.459	3.282	9.079
Master or doctoral degree	1	1.993	0.244	66.515	<0.001*	vs. Less than lower secondary education	7.334	4.544	11.839
Age group × Disability	8			93.605	<0.001*				
35-44, Hampered a lot	1	0.936	0.218	18.493	<0.001*	vs. 45-54, not hampered	2.55	1.665	3.908
35-44, Hampered to some extent	1	0.291	0.142	4.19	0.041*	vs. 45-54, not hampered	1.338	1.012	1.769
55-64, Hampered a lot	1	0.89	0.174	26.219	<0.001*	vs. 45-54, not hampered	2.436	1.732	3.424
55-64, Hampered to some extent	1	0.441	0.112	15.561	<0.001*	vs. 45-54, not hampered	1.554	1.248	1.934
25-34, Hampered a lot	1	1.026	0.247	17.31	<0.001*	vs. 45-54, not hampered	2.79	1.721	4.523

25-34, Hampered to some extent	1	0.714	0.151	22.453	<0.001*	vs. 45-54, not hampered	2.041	1.52	2.742
15-24, Hampered a lot	1	1.967	0.319	38.121	<0.001*	vs. 45-54, not hampered	7.15	3.829	13.352
15-24, Hampered to some extent	1	0.949	0.145	42.685	<0.001*	vs. 45-54, not hampered	2.582	1.943	3.432
Gender × Disability	2			41.211	<0.001*				
Female, Hampered a lot	1	0.51	0.137	13.802	<0.001*	vs. male, not hampered	1.665	1.272	2.178
Female, Hampered to some extent	1	0.481	0.084	32.884	<0.001*	vs. male, not hampered	1.617	1.372	1.906
Education Level × Disability	8			16.885	0.031*				
Lower or upper secondary education completed, Hampered a lot	1	0.506	0.285	3.155	0.076	vs. Less than lower secondary education, not hampered	1.658	0.949	2.898
Lower or upper secondary education completed, Hampered to some extent	1	0.236	0.176	1.797	0.180	vs. Less than lower secondary education, not hampered	1.266	0.897	1.786
Post-secondary, below bachelor education completed, Hampered a lot	1	-0.04	0.322	0.016	0.901	vs. Less than lower secondary education, not hampered	0.961	0.511	1.805
Post-secondary, below bachelor education completed, Hampered to some extent	1	0.065	0.204	0.102	0.749	vs. Less than lower secondary education, not hampered	1.067	0.716	1.592
Bachelor education completed, Hampered a lot	1	0.973	0.383	6.452	0.011*	vs. Less than lower secondary education, not hampered	2.645	1.249	5.602
Bachelor education completed, Hampered to some extent	1	0.332	0.226	2.154	0.142	vs. Less than lower secondary education, not hampered	1.394	0.895	2.172
Master or doctoral degree, Hampered a lot	1	0.343	0.368	0.867	0.352	vs. Less than lower secondary education, not hampered	1.409	0.685	2.9
Master or doctoral degree, Hampered to some extent	1	0.103	0.214	0.233	0.629	vs. Less than lower secondary education, not hampered	1.109	0.729	1.687
Education Level × Gender	4			3.924	0.416				
Lower or upper secondary education completed, Female	1	0.22	0.142	2.41	0.121	vs. Less than lower secondary education, male	1.246	0.944	1.645
Post-secondary, below bachelor education completed, Female	1	0.095	0.168	0.319	0.572	vs. Less than lower secondary education, male	1.099	0.792	1.527
Bachelor education completed, Female	1	0.222	0.177	1.576	0.209	vs. Less than lower secondary education, male	1.248	0.883	1.764

Master or doctoral degree, Female	1	0.257	0.172	2.241	0.134	vs. Less than lower secondary education, male	1.294	0.923	1.812
Age group × Gender	4			68.579	<0.001*				
35-44, Female	1	-0.205	0.119	2.979	0.084	vs. 45-54, male	0.815	0.645	1.028
55-64, Female	1	0.297	0.099	9.001	0.003*	vs. 45-54, male	1.346	1.109	1.635
25-34, Female	1	-0.023	0.115	0.041	0.840	vs. 45-54, male	0.977	0.781	1.223
15-24, Female	1	0.57	0.107	28.184	<0.001*	vs. 45-54, male	1.768	1.433	2.183
Age group × Education Level	16			75.125	<0.001*				
35-44, Lower or upper secondary education completed	1	-0.829	0.265	9.765	0.002*	vs. 45-54, Less than lower secondary education	0.436	0.259	0.734
35-44, Post-secondary, below bachelor education completed	1	-1.036	0.301	11.854	0.001*	vs. 45-54, Less than lower secondary education	0.355	0.197	0.64
35-44, Bachelor education completed	1	-0.484	0.321	2.277	0.131	vs. 45-54, Less than lower secondary education	0.616	0.328	1.156
35-44, Master or doctoral degree	1	-0.519	0.306	2.865	0.091	vs. 45-54, Less than lower secondary education	0.595	0.326	1.085
55-64, Lower or upper secondary education completed	1	-0.815	0.217	14.087	<0.001*	vs. 45-54, Less than lower secondary education	0.443	0.289	0.677
55-64, Post-secondary, below bachelor education completed	1	-1.229	0.25	24.182	<0.001*	vs. 45-54, Less than lower secondary education	0.293	0.179	0.477
55-64, Bachelor education completed	1	-0.958	0.275	12.141	<0.001*	vs. 45-54, Less than lower secondary education	0.384	0.224	0.658
55-64, Master or doctoral degree	1	-0.995	0.256	15.102	<0.001*	vs. 45-54, Less than lower secondary education	0.37	0.224	0.611
25-34, Lower or upper secondary education completed	1	-0.745	0.275	7.316	0.007*	vs. 45-54, Less than lower secondary education	0.475	0.277	0.815
25-34, Post-secondary, below bachelor education completed	1	-1.083	0.313	11.968	0.001*	vs. 45-54, Less than lower secondary education	0.339	0.183	0.625
25-34, Bachelor education completed	1	-0.838	0.32	6.852	0.009*	vs. 45-54, Less than lower secondary education	0.432	0.231	0.81
25-34, Master or doctoral degree	1	-0.98	0.308	10.103	0.001*	vs. 45-54, Less than lower secondary education	0.375	0.205	0.687
15-24, Lower or upper secondary education completed	1	-0.888	0.225	15.58	<0.001*	vs. 45-54, Less than lower secondary education	0.411	0.265	0.639

15-24, Post-secondary, below bachelor education completed	1	-0.434	0.277	2.451	0.117	vs. 45-54, Less than lower secondary education	0.648	0.376	1.116
15-24, Bachelor education completed	1	-0.609	0.295	4.26	0.039*	vs. 45-54, Less than lower secondary education	0.544	0.305	0.97
15-24, Master or doctoral degree	1	-0.563	0.342	2.718	0.099	vs. 45-54, Less than lower secondary education	0.569	0.291	1.112

Note. R^2 = .167 (Hosmer & Lemeshow), .182 (Cox & Snell), .261 (Nagelkerke). Model $\chi2(53) = 5182.464$, $p < .001$.
*$p < .05$

Hypothesis IIIa: the effects of gender and age will interact with each other to impact employment status in PWD.

No significant interactions between gender and any of the age groups were found for the employment status of the disabled sample (see Table 5). We therefore reject hypothesis IIIa.

Hypothesis IIIb: the effects of gender and education will interact with each other to impact employment status in PWD.

No significant interactions between gender and education levels were found for the employment status of the disabled sample (see Table 5). We therefore reject hypothesis IIIb.

Hypothesis IIIc: the effects of age and education will interact with each other to impact employment status in PWD.

Significant, negative interactions were found between age group 55-64 and all education levels, and between age group 35-44 and all education levels except bachelor's education (see Table 5). The interaction effects are in the opposite direction to the main effects of age group and education, which are all positive. We therefore accept hypothesis IIIc.

Table 5.

Analysis of maximum likelihood and odds ratio estimates for age, gender and education and interactions in PWD

	Maximum likelihood estimates					95% CI for Odds Ratio			
Parameter	***df***	**B**	**S.E.**	**Wald χ2**	***p***	**Parameter**	**Odds Ratio**	**Lower**	**Upper**
Constant	1	-1.048	0.273	14.707	<0.001*		0.351		
Gender: female	1	-0.339	0.268	1.602	0.206	vs. male	0.712	0.421	1.204
Age group	4			28.773	<0.001*				
35-44	1	1.783	0.479	13.867	<0.001*	vs. 45-54	5.946	2.327	15.195
55-64	1	0.664	0.312	4.526	0.033*	vs. 45-54	1.942	1.054	3.58
25-34	1	0.522	0.499	1.096	0.295	vs. 45-54	1.685	0.634	4.48
15-24	1	-1.401	0.57	6.043	0.014*	vs. 45-54	0.246	0.081	0.753
Education	4			89.238	<0.001*				
Lower or upper secondary education completed	1	1.857	0.284	42.766	<0.001*	vs. Less than lower secondary education	6.404	3.671	11.171
Post-secondary, below bachelor education completed	1	2.509	0.33	57.819	<0.001*	vs. Less than lower secondary education	12.291	6.438	23.467
Bachelor education completed	1	2.692	0.383	49.513	<0.001*	vs. Less than lower secondary education	14.76	6.974	31.242
Master or doctoral degree	1	3.209	0.39	67.839	<0.001*	vs. Less than lower secondary education	24.762	11.538	53.144
Education Level × Gender	4			10.326	0.035*				
Lower or upper secondary education completed, Female	1	0.136	0.255	0.283	0.595	vs. Less than lower secondary education, male	1.145	0.694	1.89
Post-secondary, below bachelor education completed, Female	1	0.026	0.293	0.008	0.929	vs. Less than lower secondary education, male	1.026	0.578	1.823
Bachelor education completed, Female	1	-0.481	0.355	1.837	0.175	vs. Less than lower secondary education, male	0.618	0.309	1.239
Master or doctoral degree, Female	1	-0.436	0.326	1.795	0.18	vs. Less than lower secondary education, male	0.646	0.341	1.224

Age group × Gender	4			3.762	0.439				
35-44, Female	1	-0.238	0.214	1.234	0.267	vs. 45-54, male	0.789	0.519	1.199
55-64, Female	1	0.095	0.157	0.362	0.547	vs. 45-54, male	1.099	0.808	1.495
25-34, Female	1	0.204	0.234	0.763	0.382	vs. 45-54, male	1.226	0.776	1.939
15-24, Female	1	0.094	0.24	0.153	0.696	vs. 45-54, male	1.098	0.687	1.756
Age group × Education Level	16			68.502	<0.001*				
35-44, Lower or upper secondary education completed	1	-1.656	0.49	11.418	0.001*	vs. 45-54, Less than lower secondary education	0.191	0.073	0.499
35-44, Post-secondary, below bachelor education completed	1	-1.742	0.534	10.633	0.001*	vs. 45-54, Less than lower secondary education	0.175	0.061	0.499
35-44, Bachelor education completed	1	-0.065	0.678	0.009	0.924	vs. 45-54, Less than lower secondary education	0.937	0.248	3.543
35-44, Master or doctoral degree	1	-1.772	0.584	9.202	0.002*	vs. 45-54, Less than lower secondary education	0.17	0.054	0.534
55-64, Lower or upper secondary education completed	1	-1.49	0.32	21.735	<0.001*	vs. 45-54, Less than lower secondary education	0.225	0.121	0.422
55-64, Post-secondary, below bachelor education completed	1	-1.839	0.365	25.331	<0.001*	vs. 45-54, Less than lower secondary education	0.159	0.078	0.325
55-64, Bachelor education completed	1	-1.646	0.424	15.074	<0.001*	vs. 45-54, Less than lower secondary education	0.193	0.084	0.443
55-64, Master or doctoral degree	1	-1.883	0.412	20.834	<0.001*	vs. 45-54, Less than lower secondary education	0.152	0.068	0.342
25-34, Lower or upper secondary education completed	1	-0.807	0.502	2.586	0.108	vs. 45-54, Less than lower secondary education	0.446	0.167	1.193
25-34, Post-secondary, below bachelor education completed	1	-0.649	0.574	1.281	0.258	vs. 45-54, Less than lower secondary education	0.523	0.17	1.608
25-34, Bachelor education completed	1	0.858	0.704	1.485	0.223	vs. 45-54, Less than lower secondary education	2.357	0.594	9.362
25-34, Master or doctoral degree	1	-0.691	0.608	1.294	0.255	vs. 45-54, Less than lower secondary education	0.501	0.152	1.648
15-24, Lower or upper secondary education completed	1	0.358	0.575	0.387	0.534	vs. 45-54, Less than lower secondary education	1.43	0.463	4.413
15-24, Post-secondary, below bachelor education completed	1	0.27	0.677	0.16	0.69	vs. 45-54, Less than lower secondary education	1.31	0.348	4.935

15-24, Bachelor education completed	1	-0.21	0.763	0.076	0.783	vs. 45-54, Less than lower secondary education	0.811	0.182	3.618
15-24, Master or doctoral degree	1	-1.514	1.078	1.971	0.16	vs. 45-54, Less than lower secondary education	0.22	0.027	1.822

Note. R^2 = .090 (Hosmer & Lemeshow), .113 (Cox & Snell), .153 (Nagelkerke). Model $\chi 2(33) = 602.448$, $p < .001$.
*$p < .05$

Discussion

Relating to the first research sub-question, our results confirmed that age, gender, education and disability all impact employment status, in line with the findings of existing studies (Jang et al., 2013; Moore et al., 2002; Moore et al., 2013, Krause & Anson, 1996; Ahrendt, 2018; Sevak et al., 2015; "Unemployment statistics", 2019). As for the second research sub-question, significant interaction effects were found between disability and age, gender and education. In the case of disability and gender, the interaction effects worked in the opposite direction: where the interaction effects resulted in a positive logit change, while the main effects resulted in larger, negative logit changes. The fact that the interaction effects work in the opposite direction to the main effects is interesting. If the interaction effect were to work in the same direction as the main effects, it would suggest that members of two disadvantaged subgroups would have an exponentially harder time with employment. The findings of our study suggest that this is not the case. This is illustrated in Figure 4, the employment gap between genders in participants either hampered a lot or hampered to some extent is smaller than participants who are not hampered. These findings echo the findings of Sevak et al. (2015), that the gender employment gap in people with disabilities was less than those without disabilities.

In the case of disability and age, a similar pattern was observed: where the interaction effects resulted in a positive logit change, while the main effects resulted in negative logit changes. The findings of previous studies also suggested that age and disability interacted, with a larger disabled employment gap in older participants, aged above 35-64 (Sevak et al., 2015; Ahrendt, 2018). Figure 5 shows the patterns of employment rates across age groups for different levels of disabilities in the current study, which is different to that observed in previous studies.

Previous studies all suggested that increasing education increased employment outcomes (Jang et al., 2013; Moore et al., 2013), and narrowed the disabled employment gap (Sevak et al.,

2015; Ahrendt, 2018). Overall, increasing education had positive effects on employment outcomes. Although most possible interactions between education and disability were not significant, the interaction found between hampered a lot and a bachelor's education is noteworthy. The narrowed gap is illustrated in Figure 6. This finding is promising, as it suggests that a bachelor's education is helpful in narrowing the employment gap associated with disability.

Figure 4

Percentage Employed by Extent of Disability and Gender

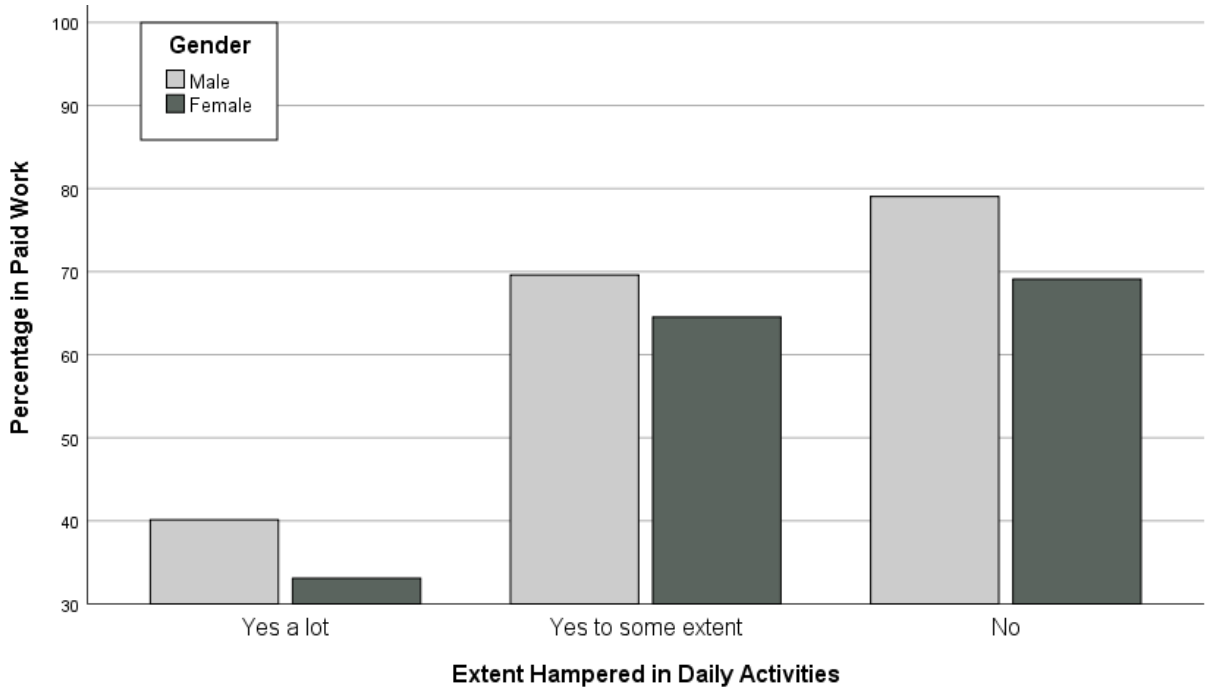


Figure 5

Percentage Employed by Age Group and Extent of Disability

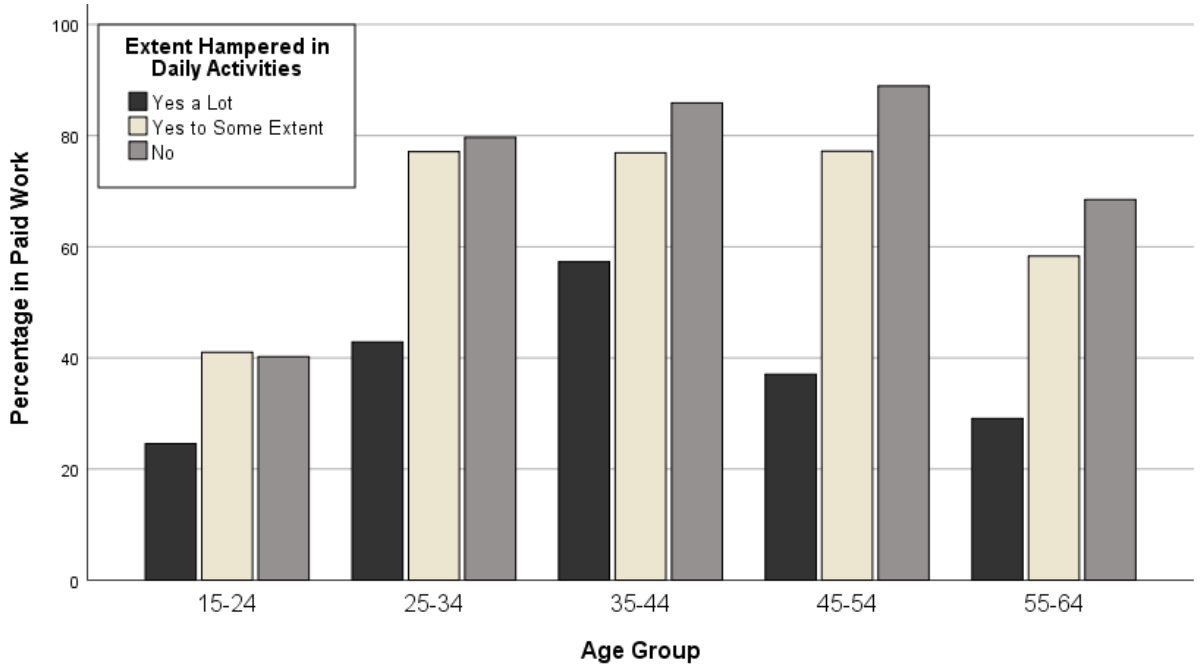
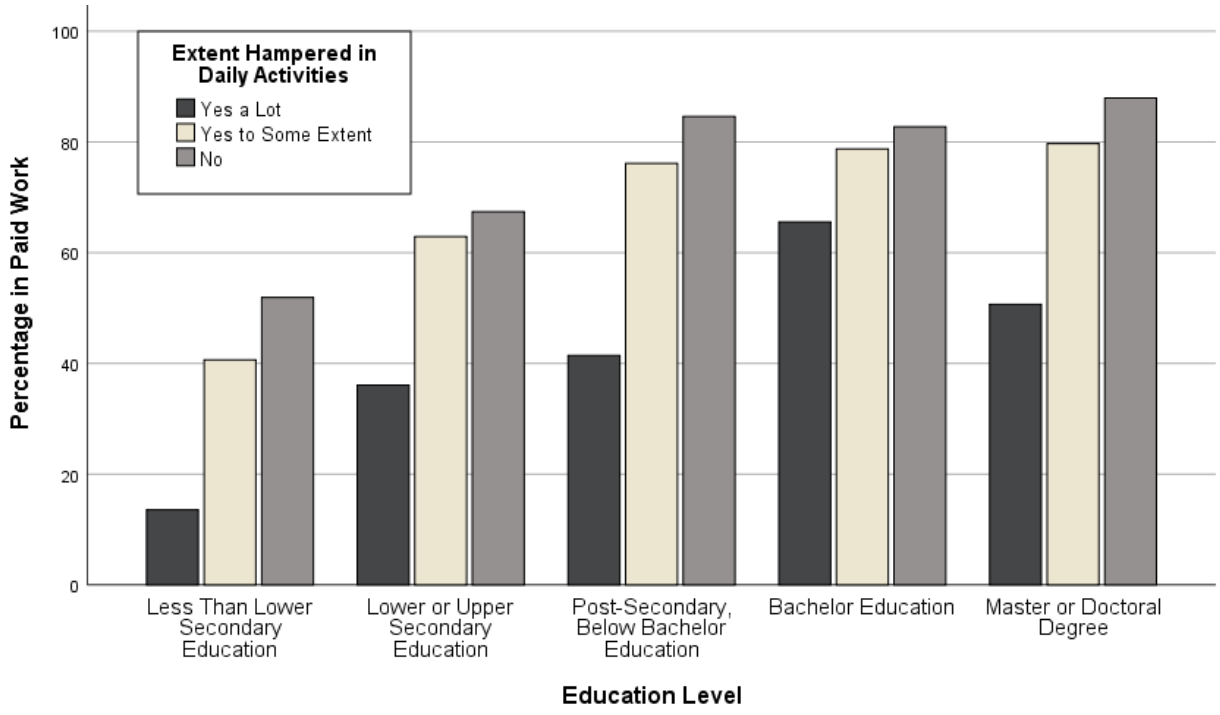


Figure 6

Percentage Employed by Education Level and Extent of Disability



Finally, we looked specifically at the disabled population, to find whether there were any significant interaction effects between gender, age and education. This had not been done before in past studies. No significant interactions between gender and age or between gender and education were found. Some significant interaction effects between age and education were found in the age groups of 35-44 and 55-64 (see Table 5). While the logit change of membership to both age groups, and increasing education were both positive, the interaction effects were negative. The results could mean the positive effects of increasing education are less pronounced for these age groups. One of the reasons for testing this was to find whether there were specific demographic subgroups within the disabled population that were particularly disadvantaged employment outcomes. From this perspective, our study did not find any particularly disadvantaged subgroups based on the demographic variables of gender, age and education.

This study sought to shed light on the employment gap for people with disabilities by investigating the within-group diversity in terms of demographic variables, starting with age, gender and education. A novel approach was taken by considering the interactions between disability and demographic variables. Internal validity refers to whether the study design and analysis addresses the research question without bias. In the current study, internal validity was helped by using a high-quality database with a large sample size, and strict, random probability sampling protocols. By conducting statistical analysis on existing data, systematic errors such as selection, performance or detection biases were also avoided. On the other hand, the European Social Survey methodology was not specifically designed to be suitable to disabled participants; a face-to-face interview of 55 minutes may not be suitable for certain disabilities, such as people with autism, or people with hearing impairments. It is possible that people with these conditions may have had difficulties with the survey or were underrepresented in the data.

External validity concerns whether the findings of a study are generalizable to other contexts. Ecological validity is a subset of external validity, which concerns whether the findings reflect real life. External validity in this study was helped by using a large data sample collected from 20 different European countries. The sampling universe of all persons aged 15 and above, residing within private households, regardless of their nationality, citizenship, language or legal status, also helped the representativity of the dataset to the general population. Survey materials were also translated to the native languages spoken by 5% of each country's population, increasing accessibility of populations that may not speak the official languages. When comparing the descriptive data of the sample with other census data sources, we also confirmed that the sample was representative of the target population. However, certain aspects of external and ecological validity may have been limited by the dataset used. Literature suggests that the type of disability can affect employment outcomes (Jang et al., 2013; Unger, 2002), information on the type of disability was not collected by this survey, and therefore could not be analysed in this study. This also has implications for the findings of this study. Whereas a bachelor's education was found to be especially helpful in narrowing the employment gap for PWD, people with learning disabilities may not be able to benefit from this. In addition to this, the demographic variables age, gender and education were selected for this study based on existing research. However, the R^2 of the binary logistic regression models in this study were not high, suggesting that the regression models built with the selected variables may not explain employment status very well. Another limitation is the operationalisation of employment in this study. Participants who had worked at least one hour in the previous week was considered employed. One week is a short timeframe and may capture an inaccurate snapshot of the employed population. The criteria of working a minimum of one hour a week is rather low, in

most cases, it is unlikely that a person can earn a meaningful wage by only working one hour a week.

Finding the right cut-off point for hours worked can be tricky, different countries have different norms for working hours and individuals may desire different amounts of work. A higher cut-off point for hours worked could be used, such as 30 hours a week, or a different measure that asks participants whether they work their desired number of hours. Some of the issues raised above are addressed in the ad-hoc module on disability of the European Labour Force Survey. Unfortunately, the microdata from this survey was not able to be accessed for use in this study. Other or more demographic variables could also be tested to see whether they are able to better explain employment outcomes. Future studies may consider these alternative operationalisations of employment and test other demographic variables and disability types. Future research could also redesign the data collection method to be more accessible for people with disabilities, for example, by shortening the length of the interview, and creating materials for the hearing and visually impaired.

Part of the inspiration for investigating the interaction between disability and demographic factors came from the theory of intersectionality. An important element of the research paradigm of intersectionality is the dynamic interactions between individual and institutional factors, and oppose the historical overgeneralization and additive treatment of demographic membership (Hancock, 2007). While the research paradigm of intersectionality is still being developed, by finding significant interaction effects, our study supports the notion of dynamic interplay between demographic group memberships. This has implications for both research and policy. In terms of policies, it suggests that employment policies that address disability and demographic factors individually in a ‘blanket’ way may not suffice. Policies may

need to be designed to the needs of specific subgroups within the disabled community. The interaction found between bachelor's education and disability also calls for educational policies that remove barriers and support PWD towards higher education, specifically bachelor's degrees, to ultimately improve employment outcomes. In terms of research, our results suggest that more attention should be paid to the interactions between demographic factors, rather than being considered and tested individually. Also noteworthy are the similarities in results found between this current study and previous studies that were conducted in the US, Taiwan, and UK, places that are presumably very different culturally, institutionally and politically. The similarity in pattern between disability and demographic variables across different context suggests that there may be factors at play even beyond the individual, institutional or political level, that should be investigated and included into the theoretical framework of disability and employment.

To conclude, this study sought for a more in-depth understanding of the in-group diversity within the PWD population. While no particularly disadvantaged subgroups of disability, gender, age and education were found, the significant interaction effects found suggest a dynamic interplay of demographic factors. Tying into the theory of intersectionality, this has implications for future research and policy-making.

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