Labour market participation of young disabled people in Norway – A study of gendered, structural, and persistent inequality

Jannike Gottschalk Ballo

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Abstract

Disabled people's labour market participation and disadvantages in the labour market are often associated with either impairment related productivity limitations or employer discrimination. This thesis applies structuration theory and intersectional theory to rich longitudinal register data of the full Norwegian population to explore how gender and education are related to structural employment inequalities of disabled people. The thesis asks three research questions:

1. How does gender and education predict labour market participation for disabled young people in terms of entry into the labour market, part-time versus full-time work, and work-relevance?
2. How is gender and education related to the longitudinal disability wage gap in the young working population?
3. What characterises stable employment trajectories of young disabled people in terms of education and gender?

The research questions are investigated in three empirical studies. The first is a cross-sectional analysis of how the interplay between gender and education predict entry versus no entry into the labour market, part-time versus full-time work, and work-relevance for disabled young people. The second study investigates the unexplained wage gap of disabled workers between the ages 20 and 40 over a period of 13 years (2005-2017) and compares the female disability wage gap with the male disability wage gap in the same period. The third study applies social sequence analysis to disabled people's life course trajectories to identify stable employment trajectories and investigates how gender, education and the interplay between gender and education relate to employment stability.

Population wide register data is particularly advantageous to studying employment outcomes of disabled people, an otherwise hard-to-reach group. By covering the entire population, the investigations of subgroups and interactions between categories are facilitated. Additionally, register data provide high data quality with few missing observations allowing for precise longitudinal analyses.

The results of the empirical studies indicate that employment inequalities of disabled people are strongly structural and persistent. The disability penalty was found to be larger for men, than women, supporting intersectional hypotheses predicting disability to displace male

privilege. At the same time, predictions of employment outcome and earnings showed that disabled women have lower occupational attainment than disabled men. This finding supports hypotheses of additive disadvantage experienced by disabled women. However, the dominating factor for their suboptimal outcomes in the labour market is attributed to gender, not disability. Findings display the educational system as having a dual role by both promoting employment and earnings for individuals, while at the same time contributing to enforcing structural inequalities on the collective level.

Further research is needed to investigate how the well-documented structural employment inequality related to disability and gender can be mitigated by social policy.

Sammendrag

Funksjonshemmedes arbeidsmarkedsdeltakelse og ulemper på arbeidsmarkedet er ofte forbundet med produktivitetsbegrensninger relatert til funksjonshemming eller med arbeidsgiverdiskriminering. Denne oppgaven anvender strukturasjonsteori og interseksjonalitetsteori på rike longitudinelle registerdata for hele den norske befolkningen for å utforske hvordan kjønn og utdanning er relatert til strukturelle sysselsettingsforskjeller for unge funksjonshemmede. Oppgaven stiller tre forskningsspørsmål:

1. Hvordan predikerer kjønn og utdanning arbeidsmarkedsdeltakelse for unge funksjonshemmede når det gjelder inntreden i arbeidsmarkedet, deltids- versus heltidsarbeid, og arbeidets relevans?
2. Hvordan henger kjønn og utdanning sammen med det longitudinelle lønnsgapet mellom funksjonshemmede og ikke-funksjonshemmede i den unge yrkesaktive befolkningen?
3. Hva kjennetegner stabile sysselsettingsforløp for unge funksjonshemmede når det gjelder utdanning og kjønn?

Forskningsspørsmålene undersøkes i tre empiriske studier. Den første er en tverrsnittsanalyse av hvordan samspillet mellom kjønn og utdanning predikerer deltakelse i arbeidslivet, deltids-heltidsarbeid og arbeidsrelevans for unge funksjonshemmede. Den andre studien undersøker det uforklarte lønnsgapet for funksjonshemmede arbeidstakere mellom 20 og 40 år over en periode på 13 år (2005-2017) og sammenligner lønnsgapet for funksjonshemmede kvinner med lønnsgapet for funksjonshemmede menn. Den tredje studien bruker sekvensanalyse for å for å identifisere og predikere stabile sysselsettingsbaner for unge funksjonshemmede. Fokuset er rettet mot hvordan kjønn, utdanning og samspillet mellom kjønn og utdanning relaterer seg til sysselsettingsstabilitet.

Registerdata på befolkningsnivå er spesielt fordelaktige for å studere sysselsettingsutfall for funksjonshemmede, som ellers er en vanskelig tilgjengelig gruppe. Populasjonsdata er godt egnet for undersøkelser av undergrupper i befolkningen og muliggjør interaksjonsanalyser dem imellom. I tillegg gir registerdata høy datakvalitet med få manglende observasjoner, noe som åpner for presise longitudinelle analyser.

Resultatene fra de empiriske studiene indikerer at ulikheter i sysselsetting for funksjonshemmede er sterkt strukturelle og vedvarende. Ulempen forbundet med

funksjonshemming ble funnet å være større for menn enn kvinner, og støtter interseksjonelle hypoteser som forventer at funksjonshemming kan fortrenge mannlige privilegier. Samtidig viste funn om sysselsettingsutfall og inntekt at funksjonshemmede kvinner har lavere yrkesoppnåelse enn funksjonshemmede menn. Dette funnet støtter hypoteser om additive ulemper knyttet til funksjonshemming og det å være kvinne. Den dominerende faktoren for funksjonshemmede kvinners ulikheter i arbeidsmarkedet kan imidlertid tilskrives kjønn, ikke funksjonshemming. Funnene viser også at utdanningssystemet har en dobbel rolle ved både å fremme sysselsetting og inntjening for enkeltpersoner, samtidig som det bidrar til å forsterke strukturelle ulikheter på samfunnsnivå.

Ytterligere forskning er nødvendig for å undersøke hvordan de veldokumenterte strukturelle sysselsettingsulikhetene knyttet til funksjonshemming og kjønn kan dempes av sosialpolitikken.

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List of studies

Study 1

Ballo, Jannike Gottschalk. 2020. “Labour Market Participation for Young People with Disabilities: The Impact of Gender and Higher Education. *Work, Employment and Society* 34 (2): 336–55. https://doi.org/10.1177/0950017019868139.

Study 2

Ballo, Jannike Gottschalk. 2022. “Is the disability wage gap a gendered inequality? Evidence from a 13-year full population study from Norway”. *Social Science and Medicine, volum 331*. Artikkel 116077.
DOI: https://doi.org/10.1016/j.socscimed.2023.116077

Study 3

Ballo, Jannike Gottschalk and Andreea Ioana Alecu. 2022. “Predicting stable employment trajectories among young people with disabilities”, *Journal of Education and Work*, submitted.

1 Introduction

The labour market participation of disabled people has both individual and societal value. Work has special benefits for people with disabilities. Not only by lifting people out of financial insecurity, but also out of social isolation. Work can promote inclusion in other arenas of society, contributing to reducing prejudice and stigma. Employment appears to have a strong effect on the political participation of disabled people. Political engagement may in turn mitigate alienation experienced by disabled people outside the work force (Schur 2002b, 346–47).

On the collective level, disabled people's labour market participation is often described as an untapped resource (Lengnick-Hall, Gaunt, and Kulkarni 2008). Estimates by the World Health Organization suggest that about 15 percent of the world's population are living with disabilities (Jurado-Caraballo, Quintana-García, and Rodríguez-Fernández 2020, 1), many of which remain outside the labour market or experience significant disadvantages within the labour market (Schur et al. 2017). The Nordic welfare state rests on a strong premise of labour market inclusiveness, and the sustainability of the welfare state depends on a high employment rate (B. Halvorsen et al. 2013). It is therefore vital, for both individual and societal reasons to promote the inclusion of disabled people in employment.

Despite the continuous development of anti-discrimination legislation and increasing scholarly interest in disabled people's labour market activities, the social inequalities of disabled people has not improved significantly in recent decades (Maroto and Pettinicchio 2015). Disability studies scholars have criticised research and policy-makers for attributing disabled people's work outcomes and lack thereof to their individual inability to carry out required tasks, calling for analyses that highlight the social, collective and structural factors of employment injustices, rather than the individual (Oliver and Barnes 2012, 13). This thesis addresses these concerns by taking a societal level and longitudinal approach to explaining disabled people's labour market participation, seeking structural explanations for inequalities.

Previous research investigating employment patterns of disabled people have attempted to disentangle individual and social causes of suboptimal work outcomes (Jones 2008; Jones and Wass 2013; Barnartt 2010), including intersectional approaches to disability and gender (Brown and Moloney 2019; Kim, Skinner, and Parish 2020; Maroto, Pettinicchio, and Patterson 2019). However, no previous studies have used full-population data to map disabled

people's work participation longitudinally and over the life course, while applying a gendered, intersectional perspective.

1.1 Objective

The objective of this study is to address limitations in current literature by mapping disabled people's labour market participation and investigating structural explanatory factors for inequalities. The examination applies an intersectional approach to the gendered employment inequalities of disabled people, including investigations of the impact of educational attainment for employment outcomes.

The thesis investigates three research questions:

1. How does gender and education predict labour market participation for disabled young people in terms of entry into the labour market, part-time versus full-time work, and work-relevance?
2. How is gender and education related to the longitudinal disability wage gap in the young working population?
3. What characterises stable employment trajectories of young disabled people in terms of education and gender?

Analyses at the societal level arrive at insights on an aggregated population level, shedding light on social, economic, political, historical, and cultural structures (Albrecht 1992). Results serve to reveal if and how organisations and processes in society produce social inequality.

1.2 Contribution

This thesis makes two main contributions to disability and gender studies. First, previous research on disability and work has relied heavily on qualitative data or quantitative survey data of self-reported disability. By employing large administrative register data, the current thesis contributes to improved compliance between data and policy on the population level. Administrative register data are not restricted by non-response or small-sample limitations, it is therefore possible to examine statistical trends over time and over the life course of individuals, precisely and robustly.

Second, the thesis contributes theoretically to research on intersectionality of gender and disability as social categories of structural inequality and power. By synthesising results from three studies, this thesis provides novel empirical evidence on the collective level about the

inequality shaping structures affecting overlapping and interactive social categories of disability and gender.

1.3 Defining disability

Disability is understood as a relational concept, where disabling processes emerge in the interaction between biological impairments and social exclusions and inequalities. The Scandinavian *gap model* (Tøssebro 2004; J. Grue 2016b) forms the basis for the empirical operationalisation, using data on receipt of basic and attendance benefits. This means that disabled people are identified by their "additional expenses incurred due to disability, injury or illness" or an "additional need for care and attendance" as laid out by the eligibility criteria of the respective benefits. "Additional" is understood either as the gap between *before and after* the onset of disability or as the gap between disabled and "healthy people".

1.3.1 On terminology

Scholars of disability studies have a history of squabbling over the superiority of "disabled people" versus "people with disabilities". According to Oliver, using "people with disabilities" equals individualising human deficit, while "disabled people" signals a disabling society. Others have argued that "people with disabilities" is the preferred terminology because it puts humanity first (Shakespeare 2013). This thesis uses both alternatives interchangeably – with a preference for "disabled people" for efficiency of writing. The variation between them has no relevance for results, or their practical and theoretical implications. Shakespeare put it precisely: "Quibbling over 'disabled people' versus 'people with disabilities' is a diversion from making common cause to promote the inclusion and rights of disabled people" (Shakespeare 2013, 19).

1.4 Defining gender

Gender is understood not primarily as an identity or social role, but as "an institutionalized system of social practices for constituting people as two significantly different categories, men and women" (Ridgeway and Correll 2004, 510). Gender as a social structure is produced by cultural rules and schemas, resulting in unequal distributions of resources (Ridgeway and Correll 2004; Risman 2018). A prerequisite to investigating gendered structures of power and inequality is adopting a binary approach to male and female. This choice is motivated by the objective to expose structural inequalities of women on a societal level, and does not contradict the recognition of gender fluidity and non-binary individual experiences and its bearing on the work context (Diamond 2020; Dray et al. 2020; Davidson 2016).

2 Theory

The theory chapter has three main purposes. The first is to show how this thesis conceptualises disability theoretically and how the current understanding relates to common variations of the term in disability studies literature. The second is to present structuration theory as a framework for understanding the various mechanisms that generate disability-related penalties in employment. The third purpose is to introduce the analytical framework of intersectionality, explain how intersectionality is operationalised and present expectations to the empirical analyses.

2.1 Conceptualising disability

Disability is a contested concept among scholars of disability studies, activists, and policymakers, not just descriptively but also in normative terms. Settling definitions is important because different understandings imply different solutions and calls for action.

Using broad strokes, the concept of disability is understood either as a *medical* issue, as a *social* issue or as something *in between*. In the following, the medical to social spectrum of conceptualisations and its implications for research and policy are discussed.

The *medical model* links disability to the individual body or mind – "handicaps imposed by nature" (Liachowitz 1988, 107) – and thus defines disability as an individual problem to be defined and solved by medical professionals. "The medical model defines disability as an individual defect lodged in the person, a defect that must be cured or eliminated if the person is to achieve full capacity as a human being" (Siebers 2008, 3). The medical model remains dominant in biomedical research (Beaudry 2016).

As a reaction to the medical model, the *social model* of disability emerged in the 1970's, driven by activists and was later theoretically developed by Vic Finkelstein (1980), Michael Oliver (1990), Colin Barnes (1991), Carol Thomas (1999; 2007; 2004) and others. Although Oliver is known as the key advocate of the social model, Susman (1994) and Grue (2016a) have suggested that the first ideas of disability as a social construction appeared in Erving Goffman's *Stigma* (1963). Goffman claimed that disabling effects are a result of the interaction between deviance and stigma (Susman 1994):

> importantly he demonstrates that deviance is not an inherent property and, in effect a person is not a deviant until his acts or attributes are perceived as negatively different […] it is not the functional limitations of impairment which constitute the greatest

> problems faced by disabled individuals, but rather societal and social responses to it (Susman 1994, 16).

Goffman, took an interactionist approach – which the social model later did not. The social model – sometimes known as the "social materialist model" for its emphasis on material and socio-economic exclusions, such as physical barriers to work and education (Goodley 2013) – proposes that people are disabled not by their medical condition, but by exclusionary barriers to societal participation (Beaudry 2016; Oliver 2013).

The prototypical conceptualisation of the social model (Oliver 1990) defines disability as "social oppression" and disabled people "as the collective victims of an uncaring or unknowing society rather than as the individual victims of circumstance" (Oliver 1990, 2–3). In this view, disability is a collective problem with responsibilities at societal level, such as universal design, accessible infrastructure, education and work inclusion and anti-discrimination programs (Loeb, Eide, and Mont 2008). Thus, in theory, anyone with limitations in bodily function will be considered nondisabled if sufficient accommodations and supports are made to secure full societal participation.

A clear distinction between impairment and disability is central to the social model, where impairment is seen as having a natural cause and disability a social cause. This dichotomy has been criticised by scholars within the field of disability studies, for failing to deal with the difficult physical realities faced by people with disabilities (Siebers 2008, 57; Shakespeare 2013). Shakespeare and Watson (2001) even suggested a complete abolishment of the UK social model:

> … we believe that the 'strong' social model itself has become a problem, and that it cannot be reformed. Our claim is that the British version of the social model has outlived its usefulness. Rather than developing piecemeal criticisms or supplying alternative arguments to fill the gaps and compensate for the inadequacies of the social model, it is time to put the whole thing to one side and start again (Shakespeare and Watson 2001, 13–14).

Later, Oliver and Barnes adopted a more pragmatic interpretation of the divide between impairment and disability, claiming that the distinction "does not deny that some impairments limit people's ability to function independently" and that it is a "simplified representation of a complex social reality" (Oliver and Barnes 2012, 23). Nevertheless, Oliver pertains that the

social model "is not about the personal experience of impairment but the collective experience of disablement" (Oliver 2009, 48).

Carol Thomas (2004) expanded the social materialist approach by integrating the psycho-emotional aspect into understandings of disability (Hanisch 2014). She differentiates between "barriers to doing" and "barriers to being", where the former refers to material barriers and socio-economic exclusions and the latter relates to the undermining of the psycho-emotional well-being of people with impairments. Disability, thus, is understood as the convergence of barriers to being and barriers to doing (Thomas 2007; Hanisch 2014, 2011–13). Although, Thomas (2004; 2007) expands the social model understanding by acknowledging disability as a potential barrier to self-esteem and personal-confidence (Hanisch 2014), she maintains a strict understanding of disability as a form of social oppression. This entails continuing the clear distinction between the meaning of impairment and the meaning of disability:

> In my view, a social relational understanding of disability is sorely needed within disability studies. It needs to be rediscovered and reasserted. My preferred definition of disability does this; it is an adaptation, or modernization, of the UPIAS formulation, as follows: Disability is a form of social oppression involving the social imposition of restrictions of activity on people with impairments and the socially engendered undermining of their psycho-emotional wellbeing (Thomas, 1999, 60). In this social relational definition, disability only comes into play when the restrictions of activity experienced by people with impairment are socially imposed, that is, when they are wholly social in origin. This means that it is entirely possible to acknowledge that impairments and chronic illness directly cause some restrictions of activity—but such non-socially imposed restrictions of activity do not constitute 'disability'. Such non-socially imposed restrictions might be better captured by the concept 'impairment effects' (Thomas 2004, 580–81).

Carol Thomas's understanding of disability is much cited and an important theoretical development of the materialist social model. However, it is hardly operationalisable in quantitative terms. In practice, it may be highly situational, dynamic, and arena-specific when and whether impairments are met with socially imposed restrictions. Thomas' definition also disregards the restrictions faced by people who suffer from pain, or people living with the constant risk of falling and suffering injuries, or the tedious "invisible work" (J. Grue 2021) performed by people with disabilities. Some type of invisible work may be socially imposed (i.e. having to call in advance to check whether venues or transport are accessible) but other types are not (i.e. getting dressed in the morning). Even in a perfectly accessible world it

would require more effort and take longer for someone with mobility restrictions to tend to personal hygiene, get dressed and out the door compared with a person without mobility restrictions. The pain, precautions and additional efforts people with impairments are faced with and must live with do restrict participation, even if they are not socially imposed. In neither Oliver, Barnes nor Thomas' definition, such restrictions are considered disability. Thus, the social model's conceptualisation of disability as equal to social oppression overlooks impairment related disadvantages that are medical in nature, as opposed to socially imposed, but that may very well have disabling consequences. And this is the crux of the matter in the critique against the social model: "People are disabled both by social barriers and by their bodies. This is straightforward and uncontroversial. The social model approach, because it 'over-eggs the pudding', risks discrediting the entire dish" (Shakespeare and Watson 2001, 17).

Shakespeare (2013) points to several important flaws of the social model. First, if disability is caused by society alone, then medical treatments and cures may be interpreted as misguided responses. However, there appears to be no intrinsic reason why a focus on social barriers necessitates the abandonment of medical research and clinical interventions. Second, when disability is considered a collective problem, a pure product of structure, then the number of disabled people becomes irrelevant (Shakespeare 2013, 18). Both for real world budgetary reasons, and for research purposes of operationalising disability, the "strong" social model is therefore problematic. Bickenbach et al. (1999) concluded their comprehensive investigations into the operationalisability of the social model, that it is not operationalisable. They argue that it does not provide the tools necessary to produce evidence of the social disadvantages of disablement. Therefore, they claim, the social model fails its aspiration to provide a workable model for research, and thus is unable to provide hard data for advocates and legislators (Bickenbach et al. 1999, 1178).

This thesis adopts a relational understanding of disability, which theoretically takes Shakespeare's "complex vagueness" as a point of departure:

> Impairment and disability are not dichotomous, but describe different places on a continuum, or different aspects of a single experience. It is difficult to determine where impairment ends and disability starts, but such vagueness need not be debilitating. Disability is a complex dialectic of biological, psychological, cultural and socio-political factors, which cannot be extricated except with imprecision (Shakespeare and Watson, 2001, 22).

Disability as a complex dialectic experience overlaps with Dan Goodley's assumptions of disability as a person-environment mismatch, as situational and contextual and as relative (Goodley 2011, 17), and also with Jan Grue's formulations on disability as best defined by "family resemblance". In citing Leo Tolstoy, he emphasises that heterogeneity among disabled people is also what ties disabled experiences together: "All normal bodies are unique, all deviant bodies know the world in the same way" (J. Grue 2021, 131).

The person-environment mismatch approach has also increasingly been adopted in the medical sphere. The World Health Organization (WHO) has progressively recognised the lived experiences of disability in developing the International classification of functioning, disability and health (ICF) (Cieza et al. 2019; Stucki and Bickenbach 2019). The ICF, which "contains an exhaustive set of categories of information which constitutes a unified and consistent language of human functioning suitable as a reference for comparing health information" (Cieza et al. 2019, 574), understands functioning in both biomedical terms, and in interaction with the physical and social environment (Stucki and Bickenbach 2019; Naples, Mauldin, and Dillaway 2019). Thus, relational shifts in both the social and medical conceptualisations of disability show tendencies of reciprocal convergence.

However, empirically and by necessity of the data utilised here, the operationalisation of disability in this thesis is closely related to the Nordic gap model, which according to Tøssebro (2004) also is the institutional definition of disability used in the Scandinavian countries (Tøssebro 2004), here explicated by Grue:

> The *gap model* […] acknowledges that a proportion of the population will at any given time have either impairments or illnesses that place certain restraints on their functional capacities. Disability is explained as the gap between those capacities and the opportunities offered by society and its institutions; disability is therefore something that can and should be addressed by the full spectrum of policy tools, ranging from medical intervention, when appropriate, to anti-discrimination measures directed at employers, academic institutions, commercial entities, etc (J. Grue 2016b, 38).

The gap model is a pragmatic proxy for Shakespeare's relational definition. Although, the gap model takes a medical condition as the starting point, disability arises when functions and limitations deviate (in a negative sense) from that of the majority. In other words, every human body has limits, but the bodily limits of the majority are not considered functional restraints. The gap model thus defines disability in negative terms by what it is not. Although

a reference to some form of majority ideal is problematic, the advantage of such a definition is that it is operationalisable with quantitative welfare data. By defining disability by what it is not, the concept also allows for indefinite heterogeneity and fluidity within the category of disability.

2.2 Structuration theory and mechanisms

Although neither of the studies included in this thesis are designed to open "the black box" of inequality-producing mechanisms or establish "causal chains" (Elster 2007, 32–33; 36), an examination of employment inequality will benefit from a discussion of the probable underlying social processes that generate inequality in outcome. In explaining individual behaviour, Jon Elster defined mechanisms as "…frequently occurring and easily recognizable causal patterns that are triggered under generally unknown conditions or with indeterminate consequences" (Elster 2007, 36). Mechanisms allow for explanation, but not prediction. The purpose of exhibiting mechanisms here is to approach a chain of cause-effect relations that has potential to explain with more detail the residual outcome observed in the current thesis. A discussion of probable mechanisms raises the thesis impact and utility for social policy making.

Given the thesis interest in social structures, and Elster's emphasis on individual behaviour, the following discussion of mechanisms is accompanied by Anthony Giddens' theory of structuration (Giddens 1984). Giddens' structuration theory provides an integrated framework for studying the interaction between individual action (i.e. agency) and social structure (i.e. culture, systems, institutions, societies). Social structure are the sum of practices that stretch across time and space, and refer to "the structural properties allowing the 'binding' of time-space in social systems, the properties which make it possible for discernibly similar social practices to exist across varying spans of time and space and which lend them 'systemic' form" (Giddens 1984, 17).

Structuration theory then posits that "neither agency nor structure is given causal primacy; rather, they are seen as mutually interdependent processes, shaping social life in a dialectical manner" (Giddens 1984; Øversveen et al. 2017, 107). When engaging in social practice, actors draw upon rules and resources of structure, and therefore "structure is inherently tied to relations of power and domination" (Øversveen et al. 2017, 107). Since social practices are embedded in existing structure, the rules and resources of those structural orders both enable and constrain human agency. Simultaneously, structure would not arise without agency.

“Human societies, or social systems, would plainly not exist without human agency. But it is not the case that actors create social systems: they reproduce or transform them, remaking what is already made in the continuity of praxis” (Giddens 1984, 171). Thus, social structure is “both the medium and the outcome of the conduct it recursively organizes” (Giddens 1984, 374).

The one key implication of adopting Giddens’s structuration theory is that individual agency and structure are considered and interpreted as interdependent and mutually transforming processes.

2.2.1 Mechanisms of employment inequality

Mechanisms that account for employment inequality can be divided into *demand*- and *supply*-side explanations. Demand-side explanations are factors related to the workplace and the labour market. These include processes of statistical discrimination, prejudice-based discrimination, social closure, institutional discrimination and the devaluation of work. Supply-side mechanisms are factors related to the workers or jobseekers, including the nature of disability, human capital, education, work experience, preferences, motivations, self-assessment and aspirations.

Mechanisms of both the demand- and supply-side predominantly describe human agency, aligning with Elster’s conceptualisation. However, in a Giddensian framework, these patterns of individual action are interpreted as recurring social practices that contribute to reproduce and transform structure, while simultaneously being enabled and constrained by the current rules and resources of the structural order they exist within.

Common to both demand- and supply-side characteristics are stereotypes about disability – also known as ableism (Campbell 2009) – a perception of disabled people as less productive, less capable and less skilled than people without disabilities. Ableism likely impacts both nondisabled and disabled people themselves (internalised ableism) (Silverman 2019), influencing how they are valued and how they value themselves in the labour market.

On the *demand-side*, statistical discrimination describes the process of making recruitment choices based on expected productivity of whole groups (Arrow 1973). Thus, disabled individuals are discriminated against based on employers’ assumptions that disabled people on average are less productive than nondisabled. A result of statistical discrimination is that disabled individuals are deprived of career opportunities, not because of individual shortcomings, but because of a belief about the average disabled person.

A variation of statistical discrimination is queuing, which entails that risk-averse employers rank job candidates from most to least attractive based on observable information (B. Reskin and Roos 1990). Disabled candidates are thus listed below nondisabled even though they might be fully able to fulfil relevant job tasks. It has been pointed out that inadequate knowledge about disability may explain reluctancy to hire disabled workers. Employers are more likely to devalue "the work ethic of disabled workers and their aspirations for career advancement while believing they are more prone to absenteeism, less committed to their work and less capable of getting along with others on the job" (Cunningham, James, and Dibben, n.d.; Wilson-Kovacs et al. 2008, 706).

Another type of discrimination is prejudice-based discrimination. According to Becker (1957), who pioneered the model of discrimination in the labour market, discrimination is a result of peoples' prejudices and preferences against minorities or groups with particular characteristics. If enough people have prejudices, the market will respond correspondingly causing certain groups to experience economic disadvantage. In the case of disabled people, Becker's theory proposes that if disabled workers are considered less attractive than nondisabled workers, there will be a lower demand for disabled workers and the price of their labour will drop. Thus, fewer disabled people will be employed, and they will be paid less than they would in a situation where discrimination would not exist. Employers' prejudices may thus cause discrimination that is not based on true productivity gaps between disabled and nondisabled workers, but on stereotypes with little support in empirical evidence (B. Reskin and Roos 1990; Charles and Grusky 2004, 17–18).

Another demand-side mechanism is social closure, which entails institutional access exclusion of individuals or groups by dominant group members who seek to preserve a team of similar peers. The exclusive group of dominant individuals are thus allowed to control and regulate status hierarchies and its rewards (Byron 2010, 440). Social closure may also take the form of favouring "soft skills" such as leadership skills or other qualities, which tend to close the door on minorities based on prejudices (Byron 2010, 440). A final important point on social closure is that it can be embedded within the structure of organizations. This is the case when the setup of formal criteria for employment presupposes certain certificates, licenses or exams that have historically favoured certain – often privileged – groups (Weeden 2002; Byron 2010).

A similar demand-side mechanism is related to the organization of the workplace, often called *institutional discrimination* (Charles and Grusky 2004, 18). Employers that can benefit from

employees with flexible work schedule, part-time contracts and low wages may be more inclined to hire disable people, than employers that require full-time presence and stable and high productivity levels. Part-time and temporary work arrangements with low wages involve little risk for the employer because the economic risk is carried by the employee.

These processes are closely related to a phenomenon which has been widely studied in the occupational gender segregation literature, namely the *devaluation of women's work* (P. N. Cohen and Huffman 2003). Employers may devalue disabled people's work based on stereotypes and inadequate knowledge and thus penalize disabled people with lower wages. Devaluation may not only apply to current or future work output but may also have bearing on competencies demonstrated in earlier work arrangements. In other words, that the work experience of a disabled person is considered less valuable than that of a nondisabled colleague, even though the experiences are objectively equal.

Turning to *supply-side* mechanisms, internalised ableism may be one of the most influential mechanisms shaping outcome. Children and young people are susceptible to prejudices about themselves, about what they can and cannot achieve, thus shaping aspirations (Charles and Grusky 2004, 18–19; Taussig 2020). Much like women are more likely to rate themselves as less competent than men (Shelley 2004), disabled workers may rate themselves as less competent than nondisabled workers. Disabled people's aspirations and self-evaluation are in turn adjusted by role-models and expectations from peers, parents, and teachers. Young people who are met with low expectations from parents or teachers due to their disability, can have difficulties achieving their goals (Shah 2008, 45); even when goals are realistic despite disability. This constrains the horizons for action for disabled people, which in turn influences how disabled people and their abilities are perceived, leading to employer discrimination. In other words, demand- and supply-side processes do not operate in isolation but reinforce each other continuously.

2.3 Intersectionality: Disability and gender

Many scholars of disability studies have embraced the theoretical framework of intersectionality acknowledging its importance in developing understandings of disabled and gendered experiences and structures (Maroto, Pettinicchio, and Patterson 2019; Garland-Thomson 2005; Moodley and Graham 2015; Brown and Moloney 2019; Shaw, Chan, and McMahon 2012; Hirschmann 2012; Goodley 2014; 2013). According to Dan Goodley, disability is intersectional in character because societal disabling processes are intrinsically

intertwined with processes of "hetero/sexism, racism, homophobia, colonialism, imperialism, patriarchy and capitalism" (Goodley 2014, 35; 2013). The analytical framework of intersectionality "recognizes how multiple systems of oppression, […] interact to disseminate disadvantage to and institutionally stratify different groups" (Robinson 2018, 69). The objective of applying an intersectional perspective is therefore to investigate how multiple markers converge and diverge (Goodley 2013). Following Goodley's (2013) interpretation of disability as constructed in the interplay with gendered norms and sexist practices, the focus of this thesis is the intersection between disability and gender.

Intersectionality originates from Kimberlé Crenshaw's seminal paper of 1989. She demonstrated that intersectionality could contribute to understandings of how multiple social and political identities combined related to variations in discrimination and privilege. Crenshaw concentrated on black women, and her work expanded the lens of feminism to include women outside the white, middle-class and cisgender categories. She argued that intersectional experiences are distinct from each other and must be included in theories and policy to meet the complexities of social subordination:

> If any real efforts are to be made to free Black people of the constraints and conditions that characterize racial subordination, then theories and strategies purporting to reflect the Black community's needs must include an analysis of sexism and patriarchy (Crenshaw 1989, 166).

Early hypotheses of intersectionality were dominated by double (black, women), triple (black, women, working class) or general multiple disadvantages related to multiple power structures piling on top of each other and causing cumulative strain (Robinson 2018, 69; Yuval-Davis 2006). Later investigations into intersectional processes presented new ways of understanding intersections between multiple markers. For example, disadvantages related to gender and disability may not be additive, but they may interact in ways that alter or distort each other (Hancock 2007). Ridgeway and Kricheli-Katz (2013) introduced the idea that different intersections produce variations of binds and freedoms. Taking the example of a study (C. L. Wilkins, Chan, and Kaiser 2011) involving race and gender they describe masculinity as related to stereotypical *white* male depictions. An experiment revealed that study participants rated Asian men to be less masculine the more stereotypically Asian their appearance. In other words, perceptions of gender were influenced by race. Others have argued that individuals with multiple group memberships may experience not just added (or subtracted) discrimination, but that the quality of discrimination may change altogether because of the

mixing of cultural and social associations and disadvantage (Shaw, Chan, and McMahon 2012). Some scholars even disregard the additive approach altogether, such as Warner and Brown (2011, 1237):

> In short, an intersectionality approach posits race/ethnicity and gender are not separate, additive, dimensions of social stratification but are mutually defining, and reinforce one another in a myriad of ways in the production and maintenance of health across the life course.

According to Robinson (2018, 77), most intersectional work now recognises that social markers, such as gender, are fluid and flexible, that is constructed, cemented or distorted through "individual interactions and social exchanges", while at the same time asserting that "gender inequities proliferate through all social institutions, including the criminal justice system, housing, healthcare, the family, and the labor market". The simultaneous maintenance of fluid categories and firm power structures may be perceived as a theoretical paradox and methodological challenge. This apparent mismatch has indeed spurred debates (Hancock 2007; McCall 2005), which will be reviewed towards the end of this chapter (see 2.2.3).

The contribution of intersectionality to disability studies has exposed disability as a social category of disadvantage – similar to gender (Garland-Thomson 2005) – and provided a framework for analysing the interactive and inequality shaping processes that take place in overlapping social power structures (Hirschmann 2012; Maroto, Pettinicchio, and Patterson 2019; McBride, Hebson, and Holgate 2015).

The objective of the remainder if the theory chapter is to demonstrate the importance of an intersectional feminist approach to investigations of disabled people's labour market outcomes; and to formulate theoretical expectations to the empirical analyses.

The first part will discuss the gendered structures of work which cause statistical disadvantage to women in general. The labour market experiences of women and men are so fundamentally different, that it would be oblivious to disregard gender in studies of labour market outcomes of disabled (as well as nondisabled) people. The second part describes and exemplifies the proposition of intersectional theory that the social structures of gender and disability may alter each other when they intersect. Modes of employment inequality may vary across intersections and must be studied with attention to interactive processes of gendered disability. The final section clarifies some methodological challenges in applying

intersectional theory to quantitative research and formulates general theoretical expectations to the empirical analyses.

2.3.1 Gendered structures of work

In studying gender as a determinant for employment outcome, this thesis conceptualises gender as a societal system of difference and inequality, where men and women are considered significantly different categories, and where belonging to the male category is assumed to be more advantageous than occupying the female category (Ridgeway and Correll 2004). The thesis' binary and categorical approach to gender as overlapping with biological sex rests on the need to reveal structural inequalities of women on a societal level and does not refute the fluidity and non-binary experiences of gender in individuals and its distinct impact on work participation (Davidson 2016; Dray et al. 2020).

In this thesis the hierarchical system of gender is assumed to be a result of institutionalised social practices that rely on hegemonic cultural beliefs about gender, here explained by Ridgeway and Correll (2004, 511):

> Widely held gender beliefs are in effect cultural rules or instructions for enacting the social structure of difference and inequality that we understand to be gender. A social structure, argued Sewell (1992), can be understood as jointly constituted by the cultural rules or schemas by which it is enacted and the distributions of resources that result. Viewed this way, gender beliefs, as the cultural rules or schemas for enacting gender, are one of the twin pillars (along with resources) on which the gender system rests (Ridgeway and Correll 2000). It is only through the development of such defining cultural beliefs that a system of difference like gender or race becomes constructed as a distinct organizing principle of social relations (Ridgeway 2000).

In the context of labour market participation, occupational attainment and income, the social system of gender produces structural inequalities through a range of mechanisms. In the following paragraphs a selection – not an exhaustive list – of inequality shaping processes are discussed: occupational segregation, hiring and wage discrimination, glass ceiling effects and motherhood penalties.

The *occupational segregation* of men and women has been documented world-wide (Charles and Grusky 2004; Petersen and Morgan 1995; Kmec 2005; Bartnik, Gabriel, and Schmitz 2021; Charles 2003), and typically analysed along two separate dynamics: horizontal and vertical segregation (Charles 2003; Charles and Grusky 2004). *Horizontal* segregation refers to the segregation in different types of occupations, originally the overrepresentation of

women in non-manual sales and service jobs, and the overrepresentation of men in manual work. *Vertical* segregation refers to gender unequal access to high-status occupations within industrial sectors (Charles 2003). Scholars are divided on the theoretical explanations for gender segregated labour markets, from gender essentialism, male primacy (Newman et al. 2011) to varieties of capitalism-perspectives (Estévez-Abe 2006; 2005), but empirical evidence is unanimous across countries.

Even in the highly gender-egalitarian countries of Scandinavia, horizontal segregation is particularly strong (Charles and Grusky 2004), and continues to be a dominant determinant of women's lower earnings in Scandinavia, as in other countries (Reisel, Østbakken, and Attewell 2019; Kmec 2005; Blau and Kahn 2017). Male-dominated occupations on average pay more, than female-dominated occupations (Albæk, Larsen, and Thomsen 2017). According to a recent study by Bartnik, Gabriel and Schmitz (2021) using US Census Population Survey (CPS) data, female-dominated occupations had the lowest earnings for both sexes, but the highest wage discrimination against women. The lowest wage discrimination was found in gender-balanced occupations.

Studies that find an unexplained gender gap in work attainment – that is after adjusting for sector, industry, occupation and other individual characteristics – often suggest that the presence of *hiring and wage discrimination* cannot be discounted (Blau and Kahn 2017). Discrimination can take the form of queuing (B. F. Reskin et al. 1990), devaluation of women's work (P. N. Cohen and Huffman 2003) or bias (resting on hegemonic gender beliefs) in hiring, evaluation and promotion decisions (Wynn and Correll 2018; Player et al. 2019).

One aspect of vertical segregation is the famous "*glass ceiling effect*" preventing women from reaching management and leadership positions (Hymowitz and Schellhardt 1986; Manzi and Heilman 2020). The glass ceiling metaphor refers to the invisible barrier of challenges faced by women, but not by men, when aiming for leadership jobs (Manzi and Heilman 2020).

Finally, the effect of parenthood has been widely documented to impact women negatively in terms of hiring and wages, supporting hypotheses of a *motherhood penalty* (Correll, Benard, and Paik 2007; Kleven, Landais, and Søgaard 2019; Sieppi and Pehkonen 2019; Hardoy and Schøne 2008; Aisenbrey, Evertsson, and Grunow 2009). An experimental study of both laboratory participants and actual employers found evidence of discrimination against mothers on both hiring and starting salary, and not against fathers. Fathers sometimes even

profited from parenthood (Correll, Benard, and Paik 2007). A recent Danish study using administrative register data found that having children leads to a long-term gender gap in earnings of 20 percent, and that child penalties are passed on through generations (Kleven, Landais, and Søgaard 2019). Correspondingly, a Finish register based study found both short- and long-term child penalties for mothers only (Sieppi and Pehkonen 2019). Also Norwegian researchers have investigated the impact of children on wages, and found that men with children receive higher wages than men without children, while the pattern is the opposite for women (Hardoy and Schøne 2008).

2.3.2 Gendering disability

A challenge in research on disability and work is to hypothesise how institutions and social processes that create hierarchies of disadvantage related to disability systematically intersect with those that produce hierarchical gender inequalities. The original theorised double disadvantage for disabled women (Fine and Asch 1985; O'Hara 2004) has been challenged by new interpretations of intersecting systems of inequality, described as interactive or "mutually defining" (Warner and Brown 2011, 1237). According to Siebers (2008, 174), the assignment to gender among disabled people is generally suppressed, because the difference between disability and ability dominates that of male versus female. These intersectional processes may be understood within a "matrix of domination" framework, where social status is defined by one's position within the matrix (Andersen and Collins 2015).

Scholars of disability studies have attempted to disentangle the interactive and mutually defining processes of intersectionality. Shakespeare (1999), for example, highlights the importance of bodily performance, for doing gender. He argues that gender is vulnerable when able-bodied functions cannot be sustained. Several theorists have used the topic of sexuality to demonstrate how disability may collapse gender stereotypes based on the able body (Kim 2011; Shakespeare 1999; Siebers 2008). Gender identities are confirmed and sometimes defined by sexuality, sexual functions, and the ability to reproduce. Kim (2011) suggested that the denial of disabled women's female gender is attributed to the myth of disabled women's asexuality (Kim 2011, 481).

Mark O'Brien's and Nancy Mairs' deeply personal accounts of sexuality and reproductive health demonstrate how disability intersects with gender by distorting stereotypes of the able-bodied gender (O'Brien 1990; Mairs 2008). O'Brien, in "Seeing a sex-surrogate", described how his paralysis interfered with his *own* perception of himself as a man: "I hadn't seen my genitals since I was six years old. […] But seeing my genitals made it easier to accept the

reality of my manhood" (O'Brien 1990, 8). Nancy Mairs, on the other hand, demonstrated in a personal essay how her multiple sclerosis diagnosis influenced how she was perceived as a woman by others. Her narrative describes a doctor advising against pregnancy and assuming without questioning that she was sexually inactive: "'Not to get pregnant,' he scribbled in my chart. 'Not to take birth control pills.' He did not, of course, suggest how I was to accomplish the former without resorting to the latter" (Mairs 2008, 4).

Numerous studies have demonstrated the displacement of gender identities among disabled people (Gerschick 2000; Shakespeare 1999; Hirschmann 2012; Mik-Meyer 2015; Shuttleworth, Wedgwood, and Wilson 2012). The relevance of identity distortions to employment outcomes may seem frail. However, Crenshaw has formulated the link between identities and power structures quite clearly: "intersectionality is not just about identities but about the institutions that use identity to exclude and privilege" (Crenshaw 2015). The question to be investigated in this thesis is thus how gender displacement of disabled people contributes to shaping exclusion and privilege in the labour market.

Previous research on the intersection between disability and gender have been predominantly concerned with what disability does to men (Shuttleworth, Wedgwood, and Wilson 2012; Caddick, Smith, and Phoenix 2015; Shakespeare 1999; Randle and Hardy 2017; Mik-Meyer 2015; Barnartt 2013). A much-cited study by Stone and Colella (1996) proposed that disability is more in conflict with cultural stereotypes of masculinity, than femininity. Stereotypical associations of disability, such as weak and dependent, contradict those of stereotypical masculinity, such as strength and endurance (Stone and Colella 1996; Garland-Thomson 2002). Therefore, disability was considered more "damaging" to men than to women. Although this study is over 25 years old and may seem conservative and outdated, more recent studies have adopted similar hypotheses. One example is a Danish study of how male employees with cerebral palsy were perceived by their colleagues:

> Men with disabilities automatically dislodge the stereotypical perceptions and assumptions of the male body as strong (Edley and Wetherell, 1995), which is why he may also be regarded as 'twice penalized', first by his impairments — his weak and imperfect body — and second or consequently by his 'wrong' biological sex (Mik-Meyer 2015, 591).

Mik-Meyer (2015) describes the feminisation of disabled male employees as a mutual enhanced process between perceptions of disability and male gender. Another example is Shuttleworth et al. (2012) who reviewed studies that engage with the dilemma of disabled

masculinity. They propose that the association of masculinity with being powerful and autonomous creates "a lived and embodied dilemma for disabled men" (Shuttleworth, Wedgwood, and Wilson 2012, 174).

An empirical study investigating disabled people's socio-economic circumstances by impairment and gender claims that men with disabilities lack the same resources attributed to nondisabled men, because of the inability to comply with hegemonic forms of masculinity:

> Access to male privilege per se does not naturally flow from being a man but requires the enactment of hegemonic forms of masculinity which may not be available to men with disabilities who may experience more marginalized forms of gender identity and practice (Kavanagh et al. 2015, 197).

These examples from qualitative investigations into intersectional processes between gender and disability demonstrate that consequences of overlapping and interactive social structures are complex and cannot be understood in simple additive terms.

2.3.3 Operationalising intersectionality quantitatively

Studies of employment participation and outcome in general increasingly avoid generalisations based on the male norm, as feminist theory contributes to the inclusion of gendered perspectives (Naples, Mauldin, and Dillaway 2019). However, the application of intersectional perspectives in sociological empirical research has incited debates about categorisation and quantification (Robinson 2018; McBride, Hebson, and Holgate 2015; McCall 2005; Hancock 2007; Naples, Mauldin, and Dillaway 2019).

The intersectionality literature demonstrates a persistent tension between the endeavour to expose power inequities between social groups versus the sensitivity to variation and fluidity within social categories. Some degree of categorisation and quantification is necessary to expose power structures (Robinson 2018). At the same time, diversity within categories limits generalisability (McBride, Hebson, and Holgate 2015). Numerous scholars have highlighted the lack of coherent methodological approach (Bowleg 2008), and called for a "roadmap" for how to use intersectionality as a methodological tool (Naples, Mauldin, and Dillaway 2019, 11).

Leslie McCall (2005) provided an influential paper in this respect, where she developed the distinctions between the "anticategorical", "intracategorical" and "intercategorical" approaches to intersectionality, in an attempt to make future studies more coherent in the application of intersectional perspectives. The anticategorical approach rejects categories

altogether because of the proposed fluidity of social categories. The intracategorical approach acknowledges groups within groups, whereas the intercategorical approach uses categories (often quantitatively) to demonstrate structures of power between social categories (McCall 2005; Robinson 2018).

Robinson captures the importance and potential contribution of the intercategorical approach by emphasising the need to reveal economic inequalities resulting from oppressive systems.

> These simultaneous comparisons of multiple categories —men and women, black and white, college-educated and high school educated— sacrifice intracategorical complexity to capture the broad shape of inequality as a set of oppressive relationships. This kind of work is essential to understanding the changing, or unchanging, nature of inequality in terms of wealth, income, employment, and health outcomes over time (Robinson 2018, 77).

Intersectionality as a research method thus has the potential of providing the empirical knowledge needed to improve policy. "In so doing, it enables a comprehensive, multi-level approach that dynamically engages individual and institutional factors in policy making across several relevant categories of difference" (Hancock 2007, 74).

However, given the suspension between studies in rejecting versus accepting the concept of social categories, and the lack of roadmap to intersectional methods, a prerequisite to successful analyses is to clarify the studies point of departure in terms of theory and methods.

> …a researcher must clearly specify what makes the study intersectional, discuss why certain methodologies chosen for the study are the most productive for intersectional research, and reflect on which aspects of intersectionality are brought into the frame and which are left out or treated less centrally in the analysis (Naples 2017, 113) (Naples, Mauldin, and Dillaway 2019, 11).

The current study can be characterised as intercategorical, since the objective to understand systems of inequality has priority over exploring variations within the disabled and gendered categories. The main interest thus lies with identifying differences between disabled and nondisabled people, between men and women, and the intersections between these two social dimensions. Intersectionality provides a framework for analysing these categorical differences, while simultaneously serving as a reminder of the limits of categorical generalisability (McBride, Hebson, and Holgate 2015).

The task of this thesis is thus to investigate how intersectional processes between gender and disability materialise and impact employment outcomes for men and women with disability – on an aggregated population level, over time, and over the life course of individuals. This approach differs from qualitative research in that results reflect collective level patterns and are not generalisable to neither specific impairments nor individual experiences. However, the quantitative approach contributes with empirical findings that either support or refute structural theories which qualitative research typically refers to. By relying on theories of social structures, qualitative research demonstrates the need for quantitative empirical investigations.

The analytical framework of intersectionality postulates no unidirectional assumption about the relationship between disability, gender and work. On the one hand, the well-documented gender bias in the labour market suggests that disabled women are subjects of "twice penalization" (O'Hara 2004) or even "two handicaps plus" (Hanna and Rogovsky 1991), as they confront both sexism, ableism and a female/disabled plus factor. On the other hand, qualitative intersectional research has demonstrated how disability breaks down gendered performances jeopardising traditional expectations to gender in the labour market, producing "disabling masculinities" (Kavanagh et al. 2015; Mik-Meyer 2015; Shuttleworth, Wedgwood, and Wilson 2012).

These two processes lead to two main overarching expectations to the thesis' empirical analyses. Theories of gendered structures of work propose that gender is the dominating structure of inequity, overruling disabling processes, thus disabled women are likely to experience less advantageous employment outcomes compared with disabled men. Second, theories of gendered disability and disabling masculinities suggest that disabled men are likely to experience stronger disability penalties compared with disabled women. These two expectations do not contradict one another, as it is possible that disabled women earn less than disabled men, while all the same the disability wage gap is larger among men than women.

3 Research context

This chapter provides a brief introduction to the Norwegian welfare model, legislation and work inclusion policies, summarizes important shifts in labour market policies during the last couple of decades and places the Norwegian welfare model in an international context.

3.1 The Norwegian welfare model

The Norwegian welfare state is known for its generous social policies and benefits providing a safety net for citizens in general throughout the life course, and for people with disabilities and health issues in particular (Hvinden 2004). Compared to other Western countries, the Norwegian model is characterised by greater universal coverage of provisions, higher benefit levels and more comprehensive availability of services (Hvinden 2004). It is widely recognised that the generous Norwegian welfare model presupposes a high degree of labour market participation in the population (Frøyland, Schafft, and Spjelkavik 2018). Thus, the model is also characterised by comprehensive activation policies with the objective to support and incentivise labour market participation. This is known as "arbeidslinjen", which translates to "the work line" (R. Halvorsen and Jensen 2004). Since the late 1990's, the work line has been an imperative for both citizens and employers. As a result, the Norwegian disability employment policies have increasingly been oriented towards a more employability-enhancing approach (Håvold, Harsløf, and Andreassen 2018).

There are a number of support schemes in place for disabled citizens in education or work. These include reading and secretary assistance for visually impaired as well as limited assistance for organizational work and daily tasks. Persons with hearing impairment can get interpreter services to perform their work. Individuals can apply for transportation services to and from the workplace or educational institutions (NAV 2022a).

User-controlled personal assistance (UPA) is a service on the municipal level of personal assistance offered to individuals in the need for both personal and practical assistance with daily tasks in or outside their own home. The service and its extent is offered on a needs basis (Ervik et al. 2020). A recent evaluation of the UPA service revealed considerable cross-municipal variation in practice and application of law in granting access to the UPA service (Ervik et al. 2020). Its municipal level organization has been criticized for not guaranteeing equal user access across municipalities, causing uncertainty and disincentivizing national mobility for education or work (NOU 2021:11 2021).

An additional service available to disabled workers, but *not* to people in education is functional assistance, which covers personal practical assistance in the work situation facilitating the performance of work tasks (NAV 2022a).

Support and accommodations for disabled persons in education are generally poorer than in working life. Education in Norway is free for all citizens, and the state educational loan fund Lånekassen offers student financing on a universal basis. In addition to the supports mentioned above (functional assistance excluded), disabled students can apply for an additional educational stipend from Lånekassen ("tilleggsstipend", approximately 400 EUR/month in 2022 for fulltime students). The additional stipend is granted to students without the capacity to also work part-time. Students receiving the additional stipend can have no paid work whatsoever (Lånekassen 2023). There exists no other type of financial support directed towards young disabled people's educational attainment and subsequent transition to work. Nevertheless, work assessment allowance (AAP) which is directed towards people who are unable to work for longer periods of time due to health reasons, is sometimes also granted to young people who need education in order to enter the labour market for the first time (L. P. Grue and Finnvold 2014). The use of AAP as support for disabled young people's education has shown positive and long-term effects on employment. However, the minimum age for eligibility was lifted from 22 to 26 years old in 2004, with the argument that young people's education in general should not be welfare subsidised (L. P. Grue and Finnvold 2014). Register studies have shown that the number of young people receiving educational support from NAV dropped after 2004, and that fewer transitioned to employment (L. P. Grue and Finnvold 2014).

Educational institutions are responsible for universal design and necessary accommodations for students with disabilities (Universitets- og høyskoleloven §4-3). However, in practice institutions have shown great variation in the willingness to implement such accommodations. A Norwegian report, using survey data among disabled students identified barriers to education for young people with disabilities, including physical, pedagogical and digital barriers (Proba 2018). Many disabled students stated in the survey that they had trouble finding a suitable and accessible place to live and that their social life was restricted due to the need for rest or for financial reasons. A majority of respondents agreed that disabled students work harder than nondisabled students and that study progression is affected (Proba 2018). Ministry for Education and Research was recently compelled to publish a briefing clarifying

the legal obligations to accommodate the needs of disabled students (Ministry of Education and Research 2021).

In addition to incentivising work participation for individuals, (i.e., extensive work inclusion efforts are usually provided before disability benefits are granted (Lundberg and Solvang 2022)), activation policies are renowned for targeting employer-engagement (Frøyland, Andreassen, and Innvær 2019). Employers' efforts in work inclusion are considered essential "to reach the goals of the active social and labour market policies" (Lundberg and Solvang 2022, 28). There are several incentives and support measure in place to stimulate employer-engagement in work-inclusion of vulnerable groups. An emphasis on employer-engagement has increased in recent years in Norway, the Nordics, as in other western countries (OECD 2010; van der Aa and van Berkel 2014).

Both wage subsidies and inclusion subsidies for necessary accommodations in the workplace are available to employers of persons with disabilities. The aid centrals of NAV (Hjelpemiddelsentralen) offer council on the accommodation of workplaces and can provide technological, mobility or other aids for persons with disabilities. Despite ideals of work participation, activation trends, and stronger employer incentives through antidiscrimination legislation, modified employment quotas, and improved wage subsidies (Østerud 2021; Lundberg and Solvang 2022), there has been a reluctance from the government to enforce formal obligations on employers (Hvinden 2004; Østerud 2021).

3.2 The impact of welfare and labour market policies

This section reviews studies that have examined variations in welfare policies across OECD countries and the impact of different models and labour market policies on employment integration of vulnerable groups. Most studies find that the Nordic welfare model is better suited to protect and promote labour market inclusion of disabled people and other vulnerable groups, but findings with regards to specific policies and mechanisms remain mixed. In spite of the seemingly beneficial characteristics of the Nordic welfare model, the disability-related employment gap remains large, according to the most recent comparative study (van der Zwan and de Beer 2021).

Although characterised by significant active labour market policies (ALMP), the generous Norwegian welfare model has also been criticised for "hampering the employment opportunities of vulnerable groups" (R. Halvorsen, Hvinden, and Schoyen 2016, 57). The

literature identifies a range of potential work exclusion mechanisms related to the comprehensive welfare model.

The impact of welfare regime on employment of people with poor health was also investigated comparatively between Norway, Sweden, Denmark, Canada and the UK in an international research report (Whitehead et al. 2009) and a two-part follow-up study (Holland, Burström, et al. 2011; Holland, Nylén, et al. 2011). Four factors relating to welfare type and labour market policies are of particular interest to the current thesis: 1) unregulated flexible labour markets, 2) generous welfare benefits, 3) ALMP, and 4) post-industrialization (specialization of labour markets). The authors hypothesised that unregulated labour markets with low employment protection would either leave the labour force more unprotected against macroeconomic forces, or conversely, make it easier for individuals with lower education and reduced work ability to enter employment. Neither a positive nor negative impact of employment protection was found in the above-mentioned studies. The hypothesis about generous welfare benefits disincentivizing labour market participation was not supported. ALMPs designed to stimulate labour market inclusion, including vocational rehabilitation, was found to partially improve labour market participation of disabled and chronically ill people (Holland, Burström, et al. 2011). Finally, theories of post-industrialisation (i.e., higher demands for flexibility, skills, credentials, performance, capacity and productivity) suggest that people with productivity limitations and low education will be more vulnerable to labour market exclusion because they are less able to meet demands and requirements. This hypothesis was partially supported by results indicating growing employment polarization between nondisabled and disabled people (Whitehead et al. 2009). Additionally, people with *both* poor health and low education were found to be particularly vulnerable to labour market exclusions. A general conclusion was that Norway and Sweden were better equipped to protect the employment of vulnerable groups than the United Kingdom and Canada (Holland, Burström, et al. 2011). However, as hypotheses of deregulation and welfare generosity were not supported, the positive characteristics of the Nordic welfare states could mostly be attributed to their comprehensive ALMPs.

The effects of the comprehensive Scandinavian welfare regimes were also examined by van der Wel et al. (2011) and van der Wel et al. (2012). Using data from European Union Statistics on Income and Living Conditions (EU-SILC) these studies investigated the regime approach to health inequalities. They found that “the Scandinavian welfare regime is more able than other regimes to protect against non-employment in the face of illness, especially

for individuals with low educational level" (van der Wel, Dahl, and Thielen 2011, 235) and that "comprehensive welfare states have lower absolute and relative social inequalities in sickness, as well as more favourable general rates of non-employment" (van der Wel, Dahl, and Thielen 2012, 1608). A general conclusion of these combined studies is that the positive impact of welfare resources were more influential than the disincentivizing effect on labour market participation.

Clayton et al. (2012) presented a systematic review of employer-engaging government policies tailored towards the labour market integration of disabled and chronically ill in Norway and four other OECD countries between 1990 and 2008. Anti-discrimination legislation was not found to have population level effect. Workplace accommodations positively impacted employment but had low uptake. Wage subsidies were found to have effect if generous enough. The involvement of employers in return-to-work processes was found to have positive potential in reducing subsequent sick-leave but had not been implemented widely enough to have a significant impact on employment.

A more recent study by Halvorsen et al. (2016) examined three mechanisms of the Nordic welfare model: compressed wage structures; generous benefits disincentivizing employment; and a general labour market specialization in high-skill activities. A compressed wage structure implies high wages at the bottom, which may make employers reluctant to hire jobseekers that come with a risk of low productivity. Generous social benefits lower the opportunity cost of not working and cause an inclination to choose social provisions over paid work. However, in a context of a compressed wage structure, the lowest wages are likely to be high enough for people to seek work. For international competitiveness, and profitability in an economy of high wage levels, many Nordic businesses specialise in high-qualification activities which require highly qualified personnel (R. Halvorsen, Hvinden, and Schoyen 2016). Halvorsen and colleagues explored these mechanisms empirically and their impact on disabled people's labour market participation in an international perspective. A general conclusion, in line with Whitehead et al. (2009), van der Wel (2011) and van der Wel (2012), was that the Nordic welfare model was not found "systematically worse" in terms of employment of disabled people, than other types of welfare regimes. They found that in countries with compressed wages, such as Norway, "persons with disabilities have employment rates closer to those of non-disabled individuals than in countries where wages are more unequal" (R. Halvorsen, Hvinden, and Schoyen 2016, 69). This means that countries with compressed wages also have the lowest in-work poverty rates, since wages at the bottom

of the wage distribution are relatively high. However, the authors still find significant variation in employment rates between the Nordic countries and point to the need for further research into regulatory instruments aimed at reducing discrimination and enhancing employment of vulnerable groups.

Another study that explored the relationship between labour market policies and the disability employment gap across countries is van der Zwan and de Beer (2021). They asked whether a more generous welfare state raises or lowers the employment gap of disabled people. Using EU-SILC data they found that a disability employment gap existed in all included countries, meaning that there was a gap between the employment rates of disabled and non-disabled people. Contradicting earlier findings, they found that even in countries where the employment rate of disabled was expected to be high (such as the Nordic countries), the gap was still large. They concluded that a generally high employment rate does not necessarily correlate with a smaller disability employment gap. The authors assessed variations in both welfare schemes and more specifically labour market policies directed towards disabled people, and results remained mixed. They found a positive association between the share of temporary jobs and the employment of disabled women. Strict employment protection legislation was also associated with higher employment rates of disabled people. They suggest that an explanation for this is that workers who become disabled are more likely to stay in the job if employment protection legislation is strict. Most European countries have labour market policies intended to support the employment of people with disabilities, but the authors did not find strong evidence that such policies had a positive impact (van der Zwan and de Beer 2021).

The Norwegian welfare state is also characterized by gender equality policies and high rates of female labour force participation. Norway is together with Finland and Iceland among the countries with the smallest gender gaps in the workforce (World Economic Forum 2022). However, the Norwegian labour market is highly gender segregated (often called the “gender equality paradox”) and gender wage gaps persist (Ellingsæter 2013; Reisel, Østbakken, and Attewell 2019).

4 Previous research

Disability is sometimes called the world's largest minority (Dwertmann 2016), affecting 15 percent of the adults worldwide (Jurado-Caraballo, Quintana-García, and Rodríguez-Fernández 2020). Yet, quantitative research on disabled people's employment outcomes occupies only a small proportion of social stratification research (Maroto and Pettinicchio 2015). Research on disability and work appears strikingly scarce in relation to other forms of social inequality such as gender, race and class (Dwertmann 2016).

The objective of this literature review is to summarise main findings from existing quantitative research and identify gaps in the current literature. Qualitative research is not included because the focus of interest for this thesis is societal level patterns in employment outcomes, more than qualitative experiences with employment inequality. The included studies for the most part utilise broad samples of disabilities, to avoid digressions into work-induced disabilities or impairment specific implications for work. Studies of employer perceptions, hiring practices, and other HR/management issues are not included. Neither are studies evaluating the effectiveness and fit of specific active labour market policies and interventions. However, the implementation of universal anti-discrimination legislation, such as the American Disability Act (ADA), has motivated a range of the studies examining the labour market activity of disabled people, and are thus included. The review pays special attention to data, disability measure, country of origin, type of employment outcome under study, and the importance of gender and education in explaining work outcome for disabled people.

4.1 Labour market participation

This section reviews studies investigating the relationship between disability and work outcome, by first focusing on employment in general, second on income and earnings specifically and finally, research on representation in occupations and non-standard employment.

4.1.1 Employment

There seems to be consensus in the literature and statistically across countries, that disability is a predictor of disadvantages in employment (ANED 2021). A review of existing empirical evidence relating to disability and labour market outcomes concluded that "Regardless of country, data source or time period disability serves to reduce labour market prospects" (Jones

2008, 405). Employment rates among the disabled were also found lower than among non-disabled, irrelevant of how disability was measured (Kruse and Schur 2003).

A majority of the studies reviewed originate in the United States, relying on *cross-sectional survey data or repeated cross-sections*. Using data from the US Survey of income and program participation (SIPP), Hale, Hayghe and McNeil (1998) found that in the year of 1994 only about 30 percent of the people with severe disabilities in the survey had participated in work or work seeking activities, in comparison to 85 percent of the nondisabled respondents. SIPP measures disability by collecting self-reported information on specific conditions, impairments, functional limitations and inability or limitation in performing a social role or task.

Similar to Hale, Hayghe and McNeil (1998), Yelin and Trupin (2000) who relied on data from the US Current population survey (CPS), found that disability accounted for low rates of job entry among disabled people. The CPS measures disability by asking whether health limitations prevent work or limit the amount or kind of work that can be performed. Schur et al. (2017) who relied on data from the 2006 US General Social Survey, similarly, found that disability limits income, security and quality of work life. The GSS identifies disability by asking whether respondents have hearing, visual, mobility or mental impairments, and whether disabilities limit activities of daily life.

Using 1998 Australian survey data, Wilkins (2004), found negative effects of disability on employment. The Australian survey included extensive disability related information such as severity of core activity restrictions, type of impairment and age of disability onset. One of very few studies from developing countries, used data from the World Health Survey and compared 15 developing countries. Disability was measured by means of questions on functional and activity limitations and participation restrictions. Lower employment rates for disabled people were found in nine countries. In these countries were a gap was identified, observable characteristics of persons with/without disabilities explained only a minor part of the gap (Mizunoya and Mitra 2013).

A significant proportion of the US studies on disability and work were motivated by an interest in the effects of the American Disability Act (ADA). These studies contribute to mapping the labour market participation of disabled people in general and employ longitudinal data. Results of ADA evaluations showed no clear positive effects, but rather null effects (Schumacher and Baldwin 2000; Maroto and Pettinicchio 2015) and negative effects

(DeLeire 2000; 2001) of the ADA on employment and income, depending on the measurement of disability (Kruse and Schur 2003). When using a measure that defines disability as conditions that restrict work capacity, the ADA apparently led to a decrease in employment (Kruse and Schur 2003). Armuor, Button and Hollands (2018) evaluated, by means of SIPP data, the impact of the 2008 expansion of the ADA (the ADA Amendments Act), and found positive effects on hiring only for disabled people with physical conditions that were less salient to employers.

A longitudinal British study using UK Labour Force Survey (LFS) data between 1998 and 2011, identifying disability as either "long lasting ill health or impairment" or "long lasting ill health or impairment which limits both work and activities in daily life" (Jones and Wass 2013). The study found a modest decrease in disability related employment penalties over the study period (Jones and Wass 2013). Another UK study aimed to investigate how the UK Disability Discrimination Act (DDA) affected employment rates between disabled and nondisabled people. They used repeated cross-sections of the nationally representative General Household Survey (GHS) over a 14-year period, and found negative effects on employment rates for people with disabilities and limiting long-term illness (Bambra and Pope 2007). In GHS disability was measured as long-standing illness, disability or infirmity and whether such illness or disability limit activities.

A recent Nordic study using comparative data from the European Social Survey, investigated work outcomes for disabled people in the Nordic and Baltic countries. Disability was defined using auto-evaluation of chronic long-standing physical or mental health problem, illness or disability and whether this limited daily activities. The authors concluded that national policies and non-discrimination laws were not sufficient in eliminating inequalities between disabled and nondisabled people (Kuznetsova, Yalcin, and Priestley 2017).

A recent study by van der Zwan and de Beer (2021) explored the disability employment gap across countries and gender using the European Union Statistics on Income and Living Conditions (EU-SILC). Disability is operationalized as self-reported activity limitations associated with long-term health problems or disability. The cross-country analysis found that variation in labour market policies could not account for the observed variation in disability employment gap, with one exception: Strict employment protection legislation was associated with higher employment rates among disabled poeple. Also summarize findings. Also consider including the other studies added under 3.2

Finally, there are several Norwegian register-based studies that should be mentioned here, since they include basic and attendance benefit receipt in childhood as a proxy for either disability, chronic illness or general ill health. These studies do not examine disability exclusively, but study labour market outcomes of vulnerable groups in general, among them people with childhood illness or disability. All of the following studies find early-onset disability and chronic illness to be a predictor for lower educational attainment and work outcome.

Kristensen and Bjerkedal (2004) studied periodic trends in labour market participation for men belonging to vulnerable groups. Chronic illness in childhood, operationalised as receipt of basic or attendance benefit during minimum one year between ages 0 and 16, was found to be a predictor for economic inactivity and unemployment in young adulthood. A further study by Bjerkedal et al. (2006) using the same operationalization of chronic illness in childhood as Kristensen and Bjerkedal (2004), studied health and social consequences og childhood chronic illness for men. Analyses revealed that onset of chronic illness was associated with lower levels of education, lower labour market participation and lower income. Similarly, a Norwegian research report by Finnvold (2013) presented a longitudinal analysis of education, employment and earnings among persons who were young recipients of basic and attendance benefits in 1985. Education and work outcome was measured in 2010. The study concluded that the disabled sample had lower educational attainment, lower employment rate and lower earnings than the general population. Average municipal educational level was found to have a stronger positive effect on the educational attainment of recipients of benefits, than on the population in general, indicating a residual educational potential among young disabled people.

Kristensen et al. (2005) studied the impact of "life course determinants" on work participation for Norwegian men using register data. This study focused on both low birth weight and childhood disease and found that both indicators were associated with lack of income the year men not in education turned 29 years old. Interaction analyses also revealed that the effect of childhood disease on unemployment in adulthood was considerably increased by both low birthweight and early social and material disadvantage.

In a follow up study, Kristensen et al. (2021) analyzed a range of determinants for work participation between 1993 and 2011, for both men and women. Very preterm birth and low birthweight were associated with a moderately increased risk of never working. Early receipt

(before 1993) of attendance benefit was associated with a considerably increased risk of never working (0.631), but only moderately for early receipt of basic benefit (0.155).

4.1.2 Earnings

Several studies have investigated disability related disparities in earnings specifically. Without exception, the studies confirm a disability related pay gap, but there are variations between studies in what the pay gap entails, how many control variables that were included and how a residual gap was interpreted.

The wage offers of young adults with and without disabilities was investigated using 1997 data of the US Survey of Youth. Disability was defined as ever having self-reported activity limiting health conditions and to which degree the conditions were currently limiting daily activities. The authors concluded that gaps in wages offered between disabled and nondisabled emerge in early adulthood and likely contribute to disparities in human capital and earnings later in life (Mann and Wittenburg 2015).

Longhi, Nicoletti and Platt (2012) studied wage gaps for disabled men using pooled cross-sections of the UK LFS, which defines disability as self-reported long-lasting activity limiting health conditions. They found that the large original wage gaps reduced substantially when adjusting for differences in education, occupation, and productivity, but cases of significant residuals remained, which the authors attributed to discrimination. These findings were supported by Maroto and Pettinicchio (2014) who found that occupational segregation of disabled people limited earnings potential for both men and women. These analyses relied on cross-sectional US survey data, the American Community Survey (ACS), although with a very large sample (over 1 mill.) and with a large range of individual control variables.

Kruse et al. (2018) pooled waves of ACS data covering the period 2008 to 2014. They found that part of the disability pay gap was productivity related, but that a substantial residual gap could be attributed to discrimination. The ACS includes six questions on disability that distinguish between visual, hearing, cognitive and mobility impairments, and whether impariments limit self-care and/or going outside alone.

The only comparative study on earnings across countries was done by Malo and Pagán (2012). They used data on 11 countries from the European Community Household Panel (pooled data from 1995–2001). Disability was defined as chronic, physical, or mental health problems, illness or disability which restricts daily activities. The authors found gaps in earnings between nondisabled and people with “hampering” disabilities in most countries.

They claim that wage gaps could be attributed to either low productivity characteristics, wage discrimination, or both.

Three studies investigated income gaps longitudinally. DeLeire (2000) studied wage differentials between disabled and nondisabled men during the period 1986-1995 using US SIPP data, and found no change in wages during the study period. A further study by the same author investigated changes in wage discrimination for disabled workers between 1984 and 1993 (DeLeire 2001). No change in discrimination was found between 1984 and 1993. In addition, a Swedish study comparing 1981 and 1991 survey data found an unexplained (residual) disability related pay gap, which was not statistically significant in 1981, but highly so in 1991. This study defined disability as either mobility problems, severe hearing or visual impairments, or severe mental health problems. Results of the study indicated a reinforcement of injustice during the ten-year period (Thoursie 2004).

4.1.3 Underemployment, non-standard jobs, and occupational representation

Several studies investigated disability as a predictor for underemployment, non-standard employment, or occupational segregation in low-competence jobs, either as the sole outcome of the study, or in combination with other work outcomes. Disability was found to be a predictor for temporary, part-time and non-standard employment, and disabled workers were found to be overrepresented in entry-level positions and low-skill jobs. Studies found lower occupational attainment among disabled people both before and after controlling for educational attainment. Occupational representation was also found to be a predictor for lower wages. These studies demonstrated the presence of disability related penalties across education and occupational attainment.

A study by Schur (2002a) using data from both CPS and SIPP found that temporary, part-time employment and independent contracting was twice as likely among persons with disabilities compared with nondisabled people. While CPS only includes questions that ask whether health problems limit the amount or type of work one can do, SIPP also includes information on various types of impairments. The author argued that non-standard employment contributed to low pay and fewer benefits, consequently feeding into high poverty rates among disabled people in the US. These findings were confirmed in a later study by the same author, again using both CPS and SIPP data (Schur 2003), where she argued that the main explanation for segregation in non-standard work was health problems that hinder many

disabled people from holding full-time jobs. Despite the financial drawbacks, Schur (2003) highlighted the advantages of contingent work for disabled people, enabling many people who would otherwise remain outside the labour market altogether. Hotchkiss (2004) is another scholar emphasising the pros of part-time work for disabled people. Her analysis of US CPS data before and after 1992, revealed that part-time work did become increasingly attractive for disabled people after the implementation of the ADA, mainly for financial reasons.

A limited number of studies have investigated the occupational representation of disabled people. Some studies attributed overrepresentation in low-competence occupations to lower qualifications among disabled people, such as the Swedish study by Thoursie (2004) and the US study by Maroto and Pettinicchio (2014). However, others, using US ACS data, found an overrepresentation in entry-level positions even after controlling for educational attainment, which resulted in lower wages, less job-security and financial instability (Kaye 2009). Maroto and Pettinicchio (2014) emphasised that structural factors such as characteristics of occupations and job requirements was one of the most important predictors for the economic situation of disabled people.

4.2 The impact of gender

A few studies have investigated the importance of the intersection between gender and disability quantitatively. Some of these studies explicitly set out to focus on how disability intersects with able-bodied gender, comparing the size of the disabling effect between disabled men and disabled women. However, most studies investigate both the size of the disabling effect and create a hierarchy of outcomes from most to least disadvantaged. Conclusions about the impact of gender on work outcome for disabled people are sensitive to methods of comparing and interpreting social dimensions of disadvantage.

Overall, the studies investigating gender and disability as determinants of employment outcomes found a smaller gender gap among disabled people, men experienced a larger disability gap than women, but disabled women in general faced stronger labour market disadvantages compared with disabled men and nondisabled women. The majority of studies that included both men and women in their sample of large survey data arrived at the conclusion that women were in fact multiply disadvantaged and experienced worse employment outcomes in comparison with both nondisabled women and disabled men.

One example of a study investigating the disabling effect, is a much cited study by O'Hara (2004) which concluded that women with disabilities experienced "twice penalisation" in that they faced employment discrimination for being both disabled and female. However, O'Hara, using US SIPP data, excluded men from the dataset, and thus was unable to compare the disadvantages of women with that of men.

Another example is the large cross-sectional study from Australia, which found that the negative disability effect on employment was greater for men than for women. However, the author did not predict outcome, so that it remained undetermined whether disabled men or disabled women faced the strongest disadvantages in the labour market (R. Wilkins 2004). A more recent cross-sectional Italian study contradicting earlier findings, found that women on average experienced a stronger disability penalty, in terms of labour force participation, than men (Addabbo, Krishnakumar, and Sarti 2017).

Pettinicchio and Maroto (2017) arrived at the same finding as Wilkins (2004), using pooled US CPS data, they found that disability presented the strongest negative effects for men, leading to the conclusion that the gender wage gap was smaller among disabled than nondisabled people. However, their analyses also established a hierarchy of disadvantage, revealing that women with multiple or cognitive disabilities experienced lower employment rates and lower earnings than disabled men and nondisabled women. Randolph and Andresen (2004), using US data from the Behavioural Risk Factor Surveillance System telephone survey, also found the gender wage gap among disabled people to be smaller than the wage gap among nondisabled people. Disability was defined as activity-limiting or work-limiting impairment or health problem, distinguishing between mental and physical disabilities. In their analyses of almost 50 000 survey respondents, they concluded that disparities in employment continued to be strong for women, regardless of disability status.

These findings were supported by Kavanagh et al. (2015) in their study of over 30 000 Australians between 25 and 64 years of age. This study employed the ICF definition of disability and associated level of functioning. The authors highlighted that the magnitude of the gender difference was smaller, and especially so among men and women with the same impairment types, compared with nondisabled people. Their findings also revealed that people with disabilities were socio-economically disadvantaged on every indicator, and that women were especially disadvantaged.

Although most studies investigated intersections of gender and disability cross-sectionally, a few longitudinal studies could be identified. One example is a UK LFS study that found that the impairment penalty on employment and earnings fell for men and increased for women over the study period 1997-2003 (Jones, Latreille, and Sloane 2006). Another example is Doren, Gau and Lindstrom (2011) who studied wage differentials over a six-year period among 521 participants of a state-wide school-to-work program. The study found that disabled men received higher starting wages than disabled women. This wage gap remained over the study period (Doren, Gau, and Lindstrom 2011). Similar trends were found by a study using South African national survey data. Disability was defined as self-reported activity limitations related to lower and upper body mobility, hearing, sight or self-care. The authors applied an intersectional approach investigating disability, gender, race and age and its impact on education, employment, and earnings. They concluded that black women with disabilities experienced the strongest negative outcomes (Moodley and Graham 2015).

Only a limited range of recent studies explicitly applied an intersectional approach to quantitative investigations of employment outcome of disabled people. Maroto, Pettinicchio and Patterson (2019) emphasised the need to study "how overlapping systems of oppression structure gender inequality". Their analyses of 2015 US ACS data revealed a hierarchy of disadvantage, where women with disabilities (who also belonged to racial minorities and have less education) reported the least income and the most reliance on welfare. The authors emphasised that "overlapping oppressions […] become embedded and reproduced within the larger social structure" (Maroto, Pettinicchio, and Patterson 2019, 64).

The intersectional, longitudinal study of Kim, Parish and Skinner (2019), using UK Life Opportunities Survey (LOS) to study the economic well-being of disabled people between 2009-2014, supported results of Maroto, Pettinicchio and Patterson (2019). The UK LOS defined disabled people as self-reported difficulties in at least one area of physical and mental functioning, and where these difficulties limited activities. According to the 2019 UK study, disabled women were less likely to be employed and less likely to work full-time, than both their male counterparts and nondisabled people. In a follow-up study, disabled women were also less likely to have supervisory responsibility than disabled men, and experienced more limits to the type and amount of work they could do than nondisabled women (Kim, Skinner, and Parish 2020). Similarly, the intersectional approach of Brown and Moloney (2019) in studying community survey data found that disabled women earned less and were less likely

to experience autonomous working conditions, than their male counterparts and nondisabled workers. This study used a 19-item index of disability, adapted from WHO's ICF definition.

4.2.1 The impact of education by gender

Most quantitative studies on disability and employment included educational variables in their analyses. A general finding across studies, countries and impairments was that disabled workers had lower qualifications than nondisabled and that the lower educational attainment was a predictor for occupational representation, lower earnings and instability (Thoursie 2004; Pettinicchio and Maroto 2017; Zarifa, Walters, and Seward 2015; Achterberg et al. 2009).

Wilkins (2004), studying Australian survey data, found that completing high school contributed to mitigating the negative effects of disability on employment for both men and women. Previous research using SIPP data also found that disabled men experienced higher pay-offs from education, than nondisabled men (Hollenbeck and Kimmel 2008). The US study by Doren, Gau and Lindstrom (2011) found that disabled men, but not disabled women, were rewarded with higher initial wages if graduating high school or successfully completing vocational rehabilitation. These findings suggest that "females do not obtain the same returns as males with disabilities from common benchmarks of success" (Doren, Gau, and Lindstrom 2011, 35). These findings suggest that education is essential for disabled people's work outcome, and that the impact of education varies by gender.

4.3 Conclusion

This literature review summarised main findings from existing quantitative research related to various employment outcomes for disabled people, the importance of gender in explaining work outcome and the impact of education. The present review demonstrates that previous research predominantly relies on survey data to investigate disabled people's employment outcomes. Except for a limited number of Norwegian register-based studies, the majority of studies reviewed employ self-reported measures of disability which define disability as something that restricts activities to varying degrees. The application of population wide data is rare, and so are longitudinal analyses. Although many survey analyses use data from multiple waves, most of them perform pooled cross-sectional analyses. Three studies could be identified examining longitudinal change in wages on a population level (Thoursie 2004; DeLeire 2000; 2001). However, these studies are 20 years old and employ data from the 1980's and mid-1990's. The reason for the absence of longitudinal analyses is mainly a lack

of appropriate data. The extant studies without exception declare that disability reduces labour market outcome, however conclusions on longitudinal trends are few and divergent.

An increasing number of studies include a gendered perspective in investigations of disabled people's employment outcomes. These studies vary in their methodological application of the gender and disability intersection, leading to variations in the type of knowledge they contribute. An interpretation of the collective results, however, leaves a relatively coherent depiction: The gender gap among disabled people is smaller than among nondisabled people. Men experience a larger disability penalty than women, but disabled women in general face stronger labour market disadvantages compared with both disabled men and nondisabled women.

Most studies reviewed here include some form of educational attainment variables in their examinations. However, the majority of studies treat education solely as a control variable, without investigating the interplay with gender on various outcomes. Although extant research indicates disability penalties in both education and employment, no study could be identified which investigated the collective and cumulative disadvantages experienced by disabled people in the educational system and labour market. There is reason to believe that the mechanisms shaping disability penalties in education and work are similar, and that the encounters with barriers, exclusion and discrimination accumulates over the life course of disabled people.

5 Data and methods

The objective of the thesis is to investigate labour market participation of young disabled people, in comparison to nondisabled peers, both over time and over the life course of individuals. All three studies employ administrative register data to examine employment outcomes of disabled people.

5.1 Register data

Administrative registries contain individual level data collected by the state about its citizens. Norwegian registers keep individual records of demographic information, education, social welfare, labour market participation, income, tax, and health care among other things. The registries' data collection mainly serves the welfare-state in its book-keeping. A unique personal identification number is used across public registers, which facilitates the merging of information from different sources (Van Der Wel et al. 2019).

For research purposes register data are sometimes called a gold mine, since information is detailed, reliable and longitudinal for the entire population. Problems of non-response and small sample restrictions do generally not apply (Van Der Wel et al. 2019). Estimations using register data usually display small standard errors because of the large N datasets, relying more on the interpretation of coefficient sizes.

All three studies in this thesis utilised register data, however, study 1 relied on the browser-based data interface www.microdata.no, due to delays in delivery of data extractions from the registries. This web-based research infrastructure provides instant access to mergeable Norwegian register data from a range of registries, with an integrated Stata-like tool for statistical analysis. The anonymity of individuals is ensured through built-in data protection (e.g. winsorisation) (Ballo 2019).

Studies 2 and 3 used so-called raw register data extracted for research purposes by Statistics Norway. The data sources and variables are the same in both www.microdata.no and in the extracted data, however, the extracted data in some cases provide a higher degree of detail and finer grained categorisations.

5.1.1 Operationalising disability

Disability was operationalised empirically using information on transfers of basic and attendance benefits offered by the Norwegian labour and welfare administration (NAV). *Basic benefits* are entitlements to "cover necessary additional expenses incurred due to

permanent injuries, illness, disabilities or congenital malformations" (NAV 2021b). Expenses may be related to the operation of assistive technology, transport, guide dog, special dietary restrictions or additional wear of clothing, bed linen, shoes, and boots. The term "additional expenses" is relative to either the individual situation before disease or injury occurred, or – if there is no before – relative to the needs of "healthy people" (NAV 2021b). The term "healthy people" is not further specified.

Attendance benefits are offered in the need of "long-term private care and supervision due to illness, injury or congenital disability" (NAV 2021a). The special need for care and supervision is again relative to either *before* or to the needs of "healthy people", and may include stimulation, training, and physical activity, but does not include practical assistance, cooking, cleaning, or shopping. The care or supervision must be provided by private individuals such as family or friends.

Basic benefits and additional benefits cover permanent expenses, understood to be persisting for at least 2-3 years, but neither benefit is connected to activity requirements or assessments of work ability. The size of the benefits follow a scheme of threshold rates, displayed in Table 1. Eligibility for disability pension (uføretrygd) does not exclude from basic and attendance benefit eligibility. This is because disability pension is meant to cover ordinary living expenses, while basic and attendance benefits are meant to cover *additional* costs incurred due to illness or impairment. These costs must be documented with for example receipts of purchase. Therefore, it is fair to assume that the receipt of basic or attendance benefit does not subsidise the cost of living in general. We can also assume that basic and attendance benefit receipt is exogenous to work in the sense that transfers do not disincentivize labour market entry.

Table 1Rates in Euro per January 2023

	Rate 1	Rate 2	Rate 3	Rate 4	Rate 5	Rate 6
Basic benefit	67	102	133	196	266	332
Attendance	119	239	477	716	-	-

Both basic and attendance benefits cover physical and mental illnesses. The exact distribution of diagnoses among recipients is not available due to problems of deficient registration of diagnoses in the NAV system (NAV 2022b). However, according to Helde (2017) and based on available NAV data, the most common diseases among recipients of basic benefits in 2016

were diseases of the dietary system (30 %); mental illnesses and behavioural disorders (12 %); diseases of the musculoskeletal system and connective tissue (12%); diseases of the nervous system (10 %); skin diseases (10 %); congenital malformations and chromosomal abnormalities (5 %); diseases of the circulatory system (3 %); diseases of the respiratory system (2 %); injuries and victims of poisoning and violence (5 %); and other diagnoses (16 %).

The regulations of basic and attendance benefits emphasise the requirement of the presence of a medical condition, here described in a government circular:

> The disorders that can be described as illness, injury or defect can be of both a physical and mental nature. When deciding whether there is an illness, emphasis is placed on whether the person is ill in the medical sense. It shall be based on a concept of illness that is scientifically based and generally recognised in medical practice (Ministry of Health and Care Services 2021).

Basic and attendance benefits were used as identifiers of disability in all three studies, but with differing criteria related to timing and duration of benefit entitlements. All three studies limited the population to young people (up to maximum age 40) because the objective was to investigate how disability in young adulthood interferes with educational and employment outcomes, as opposed to disability as a function of either aging or occupational exposure.

Study 1, as a cross-sectional study, defined disability as recipients of at least one of the two benefits in the year 2015, irrelevant of age and benefit receipt before or after 2015.

Study 2 defined disability as the first-time-receipt of at least one of two benefits before age 20, and benefit receipt in any given year after the age of 20. As a longitudinal study, this means that anyone defined as disabled in any given year did receive benefits at some point before they turned 20, and were registered as recipients in the given year. Individuals with gaps in benefit receipt were treated as nondisabled during the years they did not receive benefits.

Study 3 defined disability as the first-time-receipt of at least one of two benefits before age 20 and consecutive benefit receipt between age 20 and 34. Individuals who alternated between basic and attendance benefits during the 15 year period were treated as disabled, but individuals with gaps in benefit receipt were treated as nondisabled and excluded from the analyses. The strict criterion of consecutive receipt is related to requirements of the social sequence analysis methodology.

An implication of the benefit receipt at young age-criterion in studies 2 and 3 is that migrants arriving after the age of 20 had to be excluded from the analyses due to missing information on disability status.

5.1.2 Outcome variables

The first study investigated three outcome variables: 1) employment/no employment, 2) part-time/full-time work and 3) relevant work/overqualification. All three outcomes are dichotomous. The second study used income as the outcome variable, a measure that includes compensation for sick leave and parental leave. The third study utilised stable employment (long-term) as the dependent variable, which is an outcome created through cluster analyses of sequences.

Combined the outcome variables measure work participation, the extent of participation in time, the relevance in relation to educational level, the rewards of participation in terms of earnings and the stability of work participation over the life course.

5.1.3 Demographics

Social gender in this thesis was proxied by *biological sex* in the data. For all practical reasons social gender and biological sex are considered overlapping dichotomies. The share of non-binary, trans- or misgendered individuals in the population is estimated to range from 0.01 to 2.7 percent according to a 2019 study (Goodman et al. 2019), and thus not considered a large enough category to impact the main findings of this thesis.

The analyses further included education and parent's educational level when individuals were 16 years old. Educational data were collected from the National education database (NUDB) containing data from 1970 and onwards. NUDB utilises the Norwegian standard for educational classification (NUS2000), which includes a key to translate NUS2000 to International standard classification of education (ISCED2011). In this thesis, education variables were primarily used to distinguish between levels of education (no education/unknown education, primary, secondary, higher education (BA/MA)) and between academic and vocational upper secondary education. Finally, marital status, cohabitation, parenthood, migration background and age were used as control variables.

5.1.4 Employment related control variables

Since the three studies utilised different employment outcome variables, they also included a variation of employment related control variables. Study 1 used a variable of industrial classification (Norwegian standard for industrial classification, SN2007, building on the EU

equivalent NACE) to control for variations across industries. Study 2 controlled for work hours per week determined in a person's work contract, previous work experience in years since 1993 and occupational category (using Norwegian standard for occupational categorisation, STYRK, building on International standard classification of occupations, ISCO). In study 3 work related variables were used in the construction of the sequences, such as various income levels (see alphabet in study 3).

To adjust for inflation, both study 2 and 3 made use of the so-called price base amount (PBA) when calculating income level cut-offs. PBA is fixed annual amount regulated by the Ministry of Labour and used by NAV to calculate welfare provisions. The annual growth in PBA follows the general growth in labour market wages and is therefore a suitable measure to index adjust longitudinal income against. Former studies of labour market attachment similarly utilised national versions of PBA to adjust for relative and real changes in prices and wages (Bäckman and Nilsson 2011; Widding-Havnerås 2016; Elstad and Heggebø 2019; Gauffin, Heggebø, and Elstad 2021).

Among disabled people, sheltered employment may serve as an alternative to mainstream employment, in case of difficulties in securing or maintain ordinary work (Bend and Priola 2021). In the current studies, identification of people in sheltered work was possible using the variable for industrial classification. In study 1, individuals employed in sheltered work were identified, but not excluded, as their inclusion in the regression models made no substantial impact on results. Employees with income from sheltered work were excluded from study 2, to ensure that interpretations of disability wage gaps reflected ordinary work only. In study 3, the distribution of employees with income from sheltered work across clusters was evaluated, and most of these workers were assigned to clusters of labour market exclusions. They were therefore not removed from the data set and did not influence investigations of stable versus unstable work trajectories.

5.2 Analytical approaches

The three studies of this thesis employed data from the same registers, but the structure of the datasets varied between studies. Figure 1 provides an overview of the included cohorts and the longitudinal structure of the data employed in each study. Study 1 utilised cross-sectional data from the year 2015, including the cohorts 1980-1995. This study contributes snapshot knowledge of predictors and employment outcomes at one time point. Study 2 used pseudo-panel data between 2005-2017 including cohorts 1965 to 1997. This study contributes

longitudinal knowledge of change over an *historical timeline*. Although analyses of study 2 controlled for age, they did not investigate how employment outcomes change over the life course of individuals. Study 3 was therefore designed to investigate variations in employment trajectories (ages 20-34) of individuals, while simultaneously observing changes over time by controlling for individuals' year of birth (dotted line in Figure 1). Studies 1 and 2 both included a large number of observations, leading to small standard errors. Study 3 included a significantly smaller number of observations due to restrictions imposed by the longitudinal structure, but on the other hand provide rich and detailed insights into typical employment trajectories.

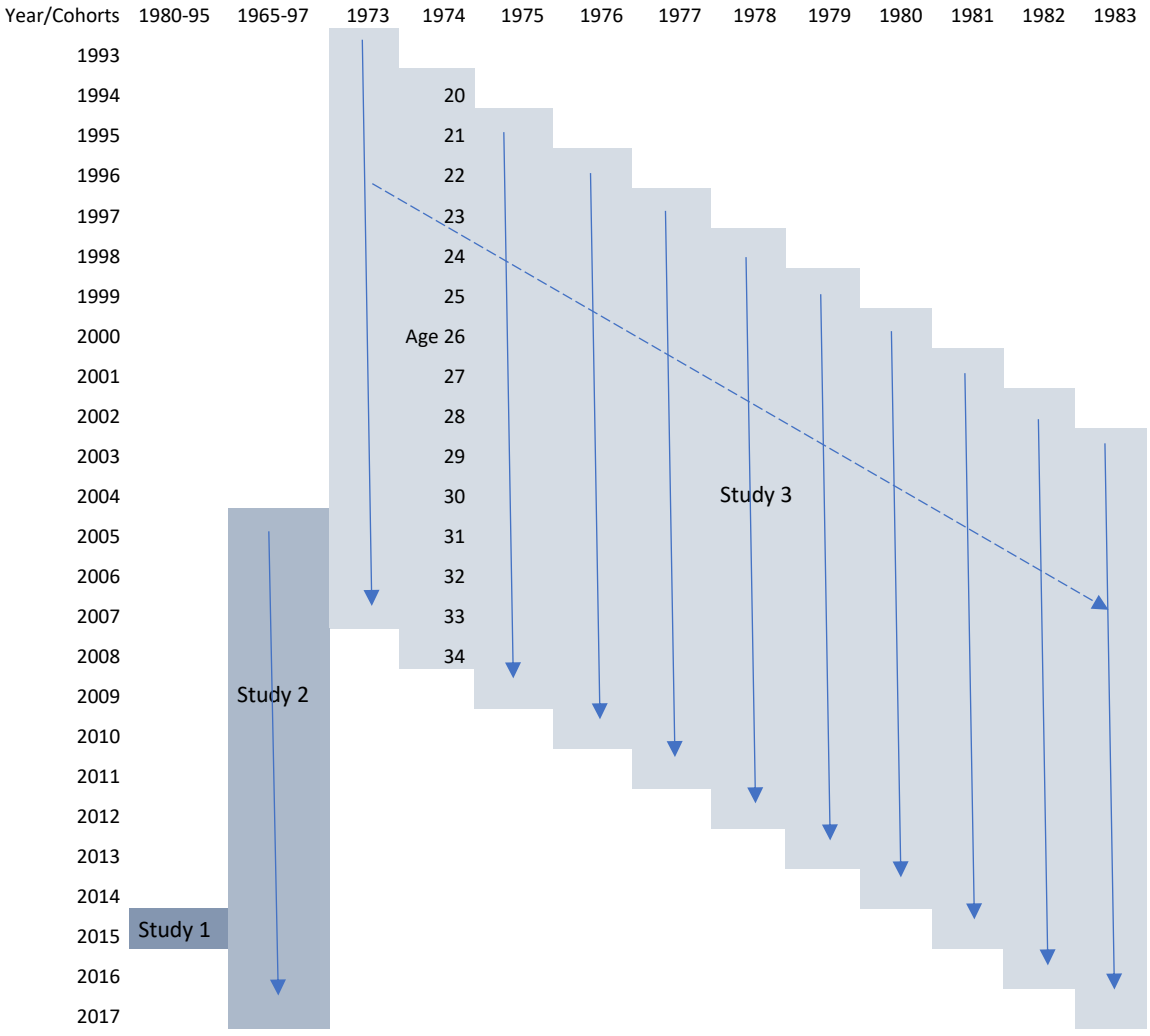

Figure 1 Longitudinal structure of the data employed in studies 1-3.

5.2.1 Regression analyses

Study 1 utilised logistic regression with average marginal effects (Mood 2010), estimated in microdata.no. Study 2 employed log-linear regression on income, using Stata. Log-linear

regression has the advantage of accounting for common right skewed distributions of income, and regression coefficients interpreted in terms of relative (probability) change (on the formula e^b-1) (Stock and Watson 2020). Study 3 performed a sequence analysis in R in combination with linear probability regressions (Mood 2010, 78), which are estimated in Stata. Social sequence analysis is explicated below.

5.2.2 Social sequence analysis

Study 3 utilised social sequence analysis to investigate labour market trajectories of disabled people. The choice of method was motivated by the lack of longitudinal research on disabled people's labour market participation, particularly the lack of research on longitudinal outcomes of work entry for this group. There is a need to investigate how events and circumstances at a young age impact work and income later in the life course.

Since the pioneering work of Andrew Abbott (1995), social sequence analysis has become increasingly popular among scholars of education to work transitions, career trajectories and family-life patterns (Ritschard and Studer 2018). The added value of sequence analysis over for example event history analysis, is the holistic perspective on life course processes, facilitating the analysis of individual long-term working histories. This also entails that single events are not analysed isolated, but "in their continuity" (Aisenbrey and Fasang 2010, 421). Sequence analysis is thus able to distinguish short and temporary labour market exclusions from long-term exclusion trajectories.

A sequence is a chronological list of states, defined by a constructed system of mutually exclusive and exhaustive categories, called the alphabet. The pairwise distance between sequences are computed according to a dissimilarity measure of choice – guided by the research question. The dissimilarity measure can emphasise either timing, order or duration of states, or a combination of these factors. Consequently, a typology of sequences is created by applying a clustering algorithm which takes the dissimilarities between sequences as input (A. Abbott and Tsay 2000).

Study 3 utilised the TramineR package in R (Gabadinho et al. 2011) to perform the sequence clustering. Further details to the method and choices regarding dissimilarity matrix, clustering algorithm, sensitivity analyses and the final prediction of clusters is available in manuscript 3 and its supplementary material.

5.2.3 Summary

The three studies in summary aimed to examine a variation in employment outcome using both cross-sectional and longitudinal methods. Change was investigated both historically over calendar years, and over the life course of individuals. In combination. the analytical approaches contribute to explaining various aspects of labour market participation and income for disabled young people.

5.3 Methodological critique and discussion

5.3.1 Coherence between theoretical and empirical definitions of disability

Grönvik (2007) has criticised classical texts in disability studies for a lack of consistency between theoretical and empirical conceptualisations of disability. The theoretical understanding of disability has evolved since Grönvik's account in 2007, for example through critique of the social materialist approach to the social model, leading to understandings of a less clear cut distinction between impairment and disability (Oliver 2009; Oliver and Barnes 2012; Shakespeare 2013). The continuum-approach to the impairment/disability divide facilitates empirical operationalisations of disability that recognise that human bodies and limitations of human bodies cannot be separated from the disabled experience.

In this thesis, the relational conceptualisation of disability using the gap model reflects the empirical data well, at least formally. Disability is empirically defined by entitlements to benefits that are offered to people with an impairment or illness that causes additional expenses or additional need for care. The term "additional" reflects the gap between the disabled minority and the nondisabled majority. Of course, an objective evaluation of a person's disability induced financial gap is never possible, but on a conceptual level, the theoretical gap model and the empirical definition via benefit entitlements are reasonably coherent.

The theoretical and empirical fit implies that the thesis contributes to developing disability as an analytical category, and thus provides a workable model for research that can deliver knowledge for advocates, policymakers and legislators, which Bickenbach et al. called for in 1999:

> Bickenbach and colleagues (1999) have conducted a rather comprehensive analysis of the possibilities to operationalise the concepts within the social model of disability. They conclude that this model: "(. . .) is provocative, but not operationalizable. It

> does not give us the tools we need to amass the evidence to substantiate claims about the social construction of the disadvantages of disablement. And in this sense it fails the two aspirations of the social model of disablement – first, to provide a workable model for research, and second to provide advocates with the hard data they need to convince legislators to pass new laws and change old ones" (1999: 1178) (Bickenbach et al. 1999) (Grönvik 2007).

5.3.2 Limitations of the current disability measure

The current disability measure has some limitations. This section discusses these limitations – 1) the inconsistency with other measures; 2) uncontrolled changes over time; 3) inclusion-exclusion bias; 4) sample restrictions; and 5) lack of data on within-variation – and their implications for findings.

First, the current disability measure diverges from other measures used in previous research. The choice of disability measure is likely to have an impact on findings. Thomas Molden and Jan Tøssebro, for instance, demonstrate that different definitions lead to very different disability prevalence rates, and that empirical findings vary with the choice of disability measurements (Molden and Tøssebro 2012). Self-reported disability is the most commonly used measure of disability. A majority of previous empirical research on disabled people's labour market participation rely on survey data, where CPS, SIPP and EU-SILC are some of the most frequently used sources of employment data.

Subjective self-assessments of disability may not overlap with more formal definitions or criteria defined by welfare administrations. Grue has expressed this divergence persuasively:

> One, it is possible for a person to be disabled without recognising themselves as such. Two, it is possible for a person to be disabled without being recognised as such by others. In fact, it seems entirely possible that the vast majority of the world's disabled population recognises itself (and is possible recognised by others) as members only of distinct categories of ill or impaired people – for example blind people, deaf people, people with multiple sclerosis, people with depression, people with schizophrenia, and people with specific kinds of intellectual disability – and not as members of a single category that is anything like 'disability' as understood in academia, in laws, in treaties, or in policy documents (J. Grue 2016a, 959).

This divergence in perspectives between people with various impairments is maybe the reason why previous research has documented that measures of disability vary greatly between surveys (Livermore et al. 2011; Baumberg, Jones, and Wass 2015; Geiger, van der Wel, and

Tøge 2017). However, the size and implications of discrepancies between various measures and definitions are unknown and underexplored, and so are the social implications of variations in measures. This has previously been pointed out by Grue in a theoretical article exploring the social meaning of disability:

> Neither the relationship between disability and specific types of illness and impairments, nor the way in which people identify with or identify others as members of one or the other category is sufficiently understood (J. Grue 2016a, 963).

This described incoherence in operationalisations between studies are likely to affect results and the comparability across studies. As the literature review of this thesis demonstrated, the disability measures of the most used survey data predominantly operationalise disability as self-reported activity- or work-restricting illness or impairment. Thus, a reduced work-capacity is implicit in these disability definitions. Also, respondents in paid work may underreport the severity of their disability (Webber and Bjelland 2015), and disability itself may be underreported due to associations of stigma. A likely consequence is that studies using self-reported disability find a *larger* disability related gap in employment, compared to the administrative definition used in this thesis which does not target work-capacity explicitly.

Second, the current measure relies on eligibility for welfare benefits. The legal criteria for eligibility and practice for granting benefits have changed over time. An overview over the changes in basic benefits between early 2000s and 2016 showed that the number of recipients has declined, and that the reasons for receiving benefits have changed (Helde 2017). Expenses related to transport used to be the most frequent reason for eligibility of basic benefits. In 2016, however, celiac disease and gluten intolerance was the most common cause of new recipients. The share of women among basic benefit recipients has increased, and there are now more women than men with basic benefit. The decline in number of recipients over the study period has been strongest among younger recipients (0-17 years). There has also been a decline in the share of young recipients of basic benefit who additionally receive attendance benefits (Helde 2017).

These changes imply that when analysing disability penalties over time, results must be interpreted with caution towards the changes in composition of the disability population. Some changes are easy to control for, such as gender and age, however, changes in impairment distributions are harder to adjust for without diagnostic data.

Third, the current measure and its inclusion criteria, like other measures, is biased. By proxying disability with welfare benefits, the operationalisation relies on 1) criteria defined by the welfare state, and 2) individual initiative to apply for benefits. Discretion and subjectivity are matters influencing both factors. People with impairments that are easily diagnosable (such as cerebral palsy, Down's syndrome, dysmelia), will be more likely to comply with eligibility criteria compared with impairments with less distinct symptoms (such as fibromyalgia).

This is to say that the measure adopted in this thesis potentially excludes persons that typically count as disabled. On the other hand, the measure may include others with health issues that may not count as disabling, such as persons with gluten intolerance and celiac disease. This is a limitation, although the first is a more serious flaw than the latter which only contributes to increasing standard errors of the estimates. To account for the former, the underrepresentation of persons with migration background is controlled for in studies 2 and 3.

Additionally, the interest or resources necessary to apply for eligible benefits are likely to be unevenly distributed in the population. Immigrants are for example underrepresented among recipients of basic and attendance benefits.

A recent study evaluating the uptake of attendance benefits among children born between 2000 and 2005, found underrepresentation of mothers with immigration background (Brekke, Evensen, and Hart 2020). The authors note lack of knowledge, social networks, cultural skills and/or language barriers resulting in higher transaction costs related to the application process, as possible explanations. The same study found lower uptake among highly educated mothers, and lower uptake among mothers with lower earnings. This tendency was to some degree also observed by Finnvold (2021) who studied a sample of 500 parents of children with physical disabilities and basic and/or attendance benefits. These findings suggest that child disability is more common among families with lower socio-economic status (SES), and/or that these benefits are an important contribution to household economy in families from low-income groups. However, when keeping diagnosis constant (Down's syndrome) in a sub-sample of 457 mothers, Brekke et al. (2020) found that highly educated mothers showed higher uptake. Although this finding was not statistically significant, it could indicate that higher educated parents are better equipped to apply for relevant benefits on behalf of their children.

Fourth, and related to the previous point, design and sample restrictions of the thesis' three studies exclude various groups of disabled people from the data. Studies 2 and 3 condition inclusion in the disabled category on early receipt of benefits which excludes immigrants that came to Norway after the age of 20. This exclusion is additional to the already documented underrepresentation of immigrants and immigrant descendants among welfare benefit recipients. Therefore, the thesis' findings may not be generalisable to disabled individuals of immigrant background.

The conditioning on early receipt may also cause over-sampling of childhood disease, which has been found to predict early disability pension (Gravseth et al. 2007). Early disability pension will cause attrition from those analyses which in addition to early benefit receipt also condition on employment. In other words, studies of inequalities within the labour market, like study 2 and study 3, examine a specific and restricted group of disabled young people, and may not be generalisable to disabled people on disability pension or to individuals with later-in-life acquired disabilities.

Fifth, the lack of data on disability severity and variations, is another limitation of the current measure. For data protection, financial and practical reasons, diagnostic data, size of benefits, and benefit rates were not available for analysis during the work with this thesis. Study 3 controlled for variations in types of benefit (basic, attendance or both benefits), but studies 1 and 2 did not investigate or control for disability variation. Therefore, the thesis' results are not differentiated by disability type, but rather emphasise the common and general structures related to a general disabled experience.

Several studies have concluded that impairment type, distinctions between physical and mental impairments, or salient versus non-salient disabilities impact labour market participation (Kavanagh et al. 2015; Brown and Moloney 2019; Maroto and Pettinicchio 2014). A study by Jones (2011) investigating implications of disability within group heterogeneity on employment and earnings found that variations in impairment were less important in determining employment, and more important in determining earnings – and then only for women. Due to the lack of data on disability variation, the current thesis sheds light on the broad category of disability and makes no claims to differentiate between various impairments or types of disabilities. Findings apply to the collective disabled experience and are not generalisable to individual circumstances.

5.3.3 Strengths of the current disability measure

Despite its limitations, the strength of the current approach to disability is first and foremost that it accounts reasonably for one of the largest methodological challenges of quantitative disability research, namely the inherent heterogeneity and fluidity of the disability status.

> Perhaps the single most demanding aspect of disability as a variable is that disability is qualitatively more complex than race, class, gender, and sexual orientation. When one wishes to account for the contribution of each factor in the matrix of oppression to the dynamics of social inequality, the heterogeneity of disability adds a significant layer of complexity to any analysis (Sommo and Chaskes 2013, 52).

> One single question, asked about one point in time, or asked AT one point in time, cannot measure an aspect of being, which is constantly changing and is based on personal, social, and cultural environments in which the person functions (Barnartt 2010, 13).

The difficulty in conceptualising and classifying disability (Altman 2001) has led some scholars to resist quantification altogether (Robinson 2018). Heterogeneity and fluid boundaries complicate the development of a collective and consistent understanding of disability which is necessary to expose structural inequalities (Maroto, Pettinicchio, and Patterson 2019). However, as Grue (2016) has formulated, a contradiction between qualitative variation and quantification is no necessity:

> Disability (or, if one prefers, ableism) can well describe the structures, arrangements, and traditions that shape the lives of a billion people with very different physiological, mental, and social characteristics, while simultaneously referring to a socially constructed and historically contingent dichotomy (Grue 2016: 962).

Feminist disability studies, according to Garland-Thomson (2005), does just this, by recognising the shared disability experiences as well as the differences among varieties of disabilities. However, the emphasis is the examination of patterns attributed to people with bodily impairments, rather than the specificities of these bodies and their functions and behaviours.

The disability operationalisation adopted in this thesis leads to analyses which reflect collective experiences, and which can contribute to exposing structures of oppression, inequality, and injustice. Individuals categorised as disabled in this thesis may not personally

identify as disabled but nevertheless contribute to revealing a collective exposure to disadvantage.

Regarding fluidity, a criterion in the measure is that the disability (or more precisely the resulting additional expenses) must be "permanent" or at least persisting for 2-3 years. This excludes people with short-term disabilities, which also serves to ensure that the current disability population consists of (relatively) long-term disabled. Short-term disabilities are not likely to have the same negative impacts over the life course as long-term or permanent disabilities. Short-term disabled people do not experience the same serious exclusions and discrimination as long-term disabled who may experience cumulative disadvantage over their life course.

Further, the longitudinal analysis of study 3 included only disabled people who were recipients of benefits over at least 15 consecutive years. Thus, study 3 provided relatively strong controls for fluidity of disability. Study 2 used a pseudo-panel, where people were defined as disabled when they received benefits and nondisabled when they did not. The nature and use of longitudinal data thus accounts for the theoretical fluidity of disability.

5.3.4 Intersectionality and full-population data

In applying the intercategorical approach to intersectionality (McCall 2005) in combination with full-population register data, this thesis contributes to empirical results that

> …can improve both the diagnosis of a policy problem and a prescriptive solution. In so doing, it enables a comprehensive, multi-level approach that dynamically engages individual and institutional factors in policy making across several relevant categories of difference (Hancock 2007, 74).

Register data facilitates the analysis of otherwise hard-to-reach populations, such as disabled people, and the examinations of variations in educational attainment and range of employment outcomes within the disability population. The large number of observations serves as a basis to dissect how intersectional processes of gender and disability produce hierarchies of disadvantage. Population level data are appropriate in investigating whether intersecting social categories are additive, cumulative or interactive, while narrative data are necessary to understand individual experiences (Sommo and Chaskes 2013, 56), and are useful in the interpretation of quantitative findings.

5.3.5 A note on causality

In study 1, the term “effect” is used when referring to the relation between independent and dependent variables. Although the results of study 1 *may* reflect causal relationships, the analyses are not designed to determine causality. Thus, results of study 1 (as well as 2 and 3) strictly reflect statistically significant predictors for work outcomes, but not causal relationships.

6 Ethical considerations

This thesis follows guidelines for ethical research issued by the Norwegian National Committee for Research Ethics in the Social Sciences and the Humanities (NESH). The ethical guidelines cover a range of topics, of which three circumstances have explicit relevance for this thesis: informed consent, data protection, and user involvement.

6.1 Waived informed consent

Obtaining informed consent from informants and research participants is an important principal in the NESH guidelines. However, when using population data obtaining consent is disproportionately challenging. Individuals under study in this thesis have therefore not been invited to give consent. According to NESH, when the requirement for consent is waived, it is essential to discuss how advantages of the knowledge produced relates to the vulnerabilities of the individuals under study. It is vital that individuals who have not been invited to give informed consent of their participation in research are protected from identification.

The objective of this thesis is to examine structural patterns in labour market participation of disabled people. At all times during the research process has the identity of individuals under study been protected. Neither researchers in contact with the data, nor consumers of the research have been able to identify individuals.

The advantage of quantitative research is the power to reveal how minority groups are subject to statistical inequalities and disadvantages. Producing this knowledge is essential for adequate development of social policy, laws and regulations designed to protect against discrimination and mitigate social injustice.

Structural patterns are difficult to identify with sample data, and especially challenging for the disabled population which because of its inherent heterogeneity is hard to define and hard to reach. The advantages of population data include the possibility to investigate longitudinal trends and relationships. These traits would be disproportionately costly to obtain using survey data.

6.2 Data protection and storage

Study 1 utilised the browser-based data analysis service www.microdata.no, which has built-in data protection. The anonymity of individuals is protected through a series of technical measures, such as added noise on frequency tables, winsorisation of extreme values and the tracking and surveillance of all research activity within the portal (Ballo 2019).

Study 2 and 3 used extracted register data, which were handled and analysed within the encrypted Services for sensitive data server (TSD). The TSD server uses multifactor authentication, access restriction and access log to ensure the protection of sensitive data. All data will be deleted at the end of the project period.

6.3 User involvement

User involvement can strengthen the quality and relevance of the research, promote democratic rights and hinder discrimination. Preliminary findings of this thesis were presented multiple times to representatives from disability organisations (The Norwegian Association of the Disabled, The Norwegian Association of Youth with Disabilities), representatives from employer organisations (Confederation of Norwegian Enterprise and Spekter) and representatives from unions (Norwegian Confederation of Trade Unions). Results were also presented and discussed with health practitioners at both The Department for Neurohabilitation at Oslo University Hospital, and The National Centre of Expertise for Rare Diagnoses (TRS) at Sunnaas Rehabilitation Hospital.

This means that the thesis' main findings have been exposed to interpretation by the users and relevant actors in the field of disability, rehabilitation and employment. Overall, the main findings resonated with both users, employers, and health professionals. Their lived experiences and personal anecdotes also pointed me toward further inquiries and reasonable interpretations of current findings.

Discussions with the users and professionals had tangible impact on the thesis' quality and relevance. For example, in questioning the use of population welfare data to proxy disability, the users emphasised the need for a thorough elaboration of the way disability is theoretically defined and empirically operationalised in the thesis.

7 Summary of journal articles

Study 1

Ballo, Jannike Gottschalk. 2020. "Labour Market Participation for Young People with Disabilities: The Impact of Gender and Higher Education." *Work, Employment and Society* 34 (2): 336–55. https://doi.org/10.1177/0950017019868139.

Previous research has suggested that the entry into the labour market is crucial for young disabled people, as missing the transition from education to employment increases chances of permanent exclusion. Intersectional theory warns against the generalisability of the female and male experiences. This study therefore investigates the impact of higher education on labour market outcomes for disabled people in a gendered perspective.

The objective of study 1 is threefold: (1) to examine the gender differences in labour market participation among young people with disabilities; (2) to study the effect of higher education on labour market participation; and (3) to examine how higher education influences the effect of gender on labour market participation.

An intersectionality approach is applied to full population register data, and multivariate logistic regression models are estimated on three labour market outcomes: employment, full-time work and job relevance. When combined, the three outcomes measure not only the chances of being inside or outside the labour market, but also the extent of participation and its relevance for individual qualifications. Thus, this study covers both economic and intellectual aspects of work and produces more robust results as opposed to limiting examinations to one single measure of work participation.

The analyses clearly show that higher education had a stronger influence on employment and full-time work for people with disabilities than it had for the non-disabled population. The analyses found that women benefited more from higher education than men. The empirical analyses do not conclude that disabled women were superior to disabled men, but rather indicate that disability evens out the usual inequality between men and women in the labour market.

The main contribution of this article to the field of disability studies is the application of intersectionality to full-population data, providing population level knowledge on the dynamic between gender, disability, and the labour market. The findings confirm that

disability may cause distortion of the male identity, indicating that disabled men are deprived of the privilege it otherwise is to be a man in the labour market.

Study 2

Ballo, Jannike Gottschalk. 2022. “Is the disability wage gap a gendered inequality? Evidence from a 13-year full population study from Norway”. *Social Science and Medicine, volum 331*. Artikkel 116077.
DOI: https://doi.org/10.1016/j.socscimed.2023.116077

Recent research has found that the lower educational attainment and occupational segregation of disabled people limit their earnings potential. However, due to difficulty in obtaining appropriate data, the career opportunities and income levels of disabled people have not been sufficiently explored in quantitative terms. This study contributes to both disability and gender research by addressing the following research questions: 1) What explains the disability wage gap and how has it changed over time? 2) How are disabled working people affected by the gendered inequalities of the labour market?

The study extends the extant literature by using rich Norwegian full population annual register data (N ≈ 10 600 000) to predict the disability pay gap over a 13-year period. The analyses arrive at two main findings: 1) Educational and occupational attainment accounted for a large proportion of the disability wage gap, but a statistically significant *unexplained* wage gap remained and persisted over the study period. 2) The unexplained disability wage gap was larger among men, than women. However, the predicted income of disabled men was higher than that of both nondisabled and disabled women. In addition, men experienced a small but statistically significant reduction in disability wage gap over the study period, while it remained constant for women.

The findings indicate that disability related income inequality exist both between occupations and within occupations, and confirm that disabled people experience both horizontal segregation (i.e. unequal access to types of occupations) and vertical segregation (i.e. unequal career opportunities within occupations). The study demonstrates that the disabling effect on income is stronger for men than women. However, gender is shown to be a defining predictor for income causing greater additive penalties for disabled women.

Relying on 10.6 million observations over a 13-year period, this study contributes with robust findings that emphasise the importance of structural inequality as explanations for income. Given the persistence of disabled people’s income disadvantages, policymakers should evaluate how social regulation can be adapted to improve labour market representation and wage inequalities of disabled people.

Study 3

Ballo, Jannike Gottschalk and Andreea Ioana Alecu. 2022. “Predicting stable employment trajectories among young people with disabilities”, *Journal of Education and Work*, submitted.

Research aiming to explain disabled people’s inequalities in the labour market has focused primarily on transitional factors between school and work, and individual level background characteristics as explanations for entry (or no-entry) into the labour market or for income disadvantages. The objective of study 3 is to address the lack of longitudinal research on disabled people’s labour market attachment by applying a holistic perspective on working histories by means of social sequence analysis.

The study aims to identify stable employment trajectories of disabled people and determine how gender and education relate to probabilities of stable employment trajectories. The analyses relied on administrative register data of 3223 disabled people between the ages 20 and 34 from birth cohorts 1973 to 1983. This study first analysed labour market trajectories among disabled persons, with the aid of sequence analysis. Based on these analyses, clusters of labour market trajectories where created – which – *inter alia* – differentiate between stable and unstable employment trajectories. This allowed for explorations of what conditions were related to strong labour market attachments for disabled persons.

The investigations arrived at four main findings. 1) Women were less likely to experience stable employment trajectories. 2) Men not registered in education at the age of 20 were significantly more likely to experience stable employment trajectories than women not in education at the same age. 3) Men in upper secondary vocational track are more likely to experience stable employment trajectories, than women in vocational tracks. 4) No gender differences were found among individuals registered in higher education at the age of 20.

Findings confirm the multiplicative effects of the disability and female status with quantitative population data. Proposed mechanisms of intersectionality about social identities obscuring each other, may very well be true in *individual* situations, but study 3 clearly demonstrates that being female and disabled remains a disadvantaged position on the societal level and over the life course.

This study has two main practical implications. First, the facilitation of education for disabled youth should be strengthened, and especially so for disabled women. Second, alternative

paths to employment for individuals who are unable to complete education should be considered by policymakers, social workers, and employers.

8 Discussion

Extant literature provide evidence of disabled people being disadvantaged in the labour market (Kruse et al. 2018; Schur et al. 2017). However, research on disability and employment is limited in comparison to other forms of social inequality like gender, race and class (Dwertmann 2016). Additionally, the existing literature is highly focused on investigating determinants of entry into to the labour market, or inequalities within the labour market, without paying attention to the longitudinal benefits and penalties disabled people experience over their life course.

Previous quantitative research relies almost exclusively on survey data, limiting investigations by problems of non-response, small-sample or limited time-series. While short-term exclusions may be unproblematic (Gauffin, Heggebø, and Elstad 2021), more serious consequences of long-term exclusions or injustices are largely disregarded in the absence of detailed and extensive longitudinal data. It is also the long-term patterns of employment inequality that carry the highest costs, both for individuals and for society as a whole (Gauffin, Heggebø, and Elstad 2021).

Research on disabled people's employment participation and outcomes increasingly highlight the need to understand disability and work in a gendered perspective, as disability is considered inherently intersectional, created in interaction with gender (Naples, Mauldin, and Dillaway 2019; Goodley 2014).

This thesis addresses limitations and calls in previous research by using full-population register data to investigate labour market participation of young disabled people – in an intersectional gendered perspective. The present studies examined a range of employment related outcomes, employing various methods on cross-sectional data, pseudo-panel data and life course data.

8.1 Summary

The thesis' three studies all explored the labour market participation of disabled young people, how gender and education contributed to explain variations in participation and work outcome. Analyses also examined outcomes over time (Study 2) and over the life course of individuals (Study 3).

Study 1 and 2 both suggest that men experience a stronger disability penalty, than women, which challenges traditional intersectional theories that hypothesise disabled women to be

twice penalised. However, study 1 does not predict outcomes for all four groups and is therefore unable to conclude on the hierarchy of employment outcomes among them. Study 2 on the other hand, did predict adjusted income for disabled women and men, and nondisabled women and men, and concludes that disabled men's income was lower than nondisabled men's but higher than that of both nondisabled and disabled women. In other words, men may experience a stronger disabling effect than women, while at the same time occupying a more advantaged position in terms of work outcome than disabled women. In addition, study 2 showed that men experienced a small but statistically significant reduction in the unexplained disability wage gap over the study period, while it remained constant among women. Investigations of study 3 revealed that women were less likely than men to experience stable employment trajectories.

Higher education proved more important for disabled people and especially for disabled women, compared with nondisabled people in terms of work outcomes (study 1). Men in upper secondary vocational track were more likely to experience stable employment trajectories, than women in vocational tracks, but higher education eliminated gender differences in probabilities of stable employment trajectories (study 3). Thus, disabled women profited more from higher education than disabled men (study 1 and 3).

In summary, the thesis confirms that gender is a defining predictor for a range of employment related outcomes, and that disabled women are especially disadvantaged. The synthesised findings demonstrate the complexities of intersectional processes. Results indicate that disability seems to interfere with able-bodied masculinity, but at the same time support traditional intersectional theories of overlapping disadvantaged social positions. Disabled women are more disadvantaged than both disabled men and nondisabled women. The current findings provide novel empirical evidence on the collective level about the inequality shaping structures affecting overlapping and interactive social categories of disability and gender.

8.2 Discussion of main findings

This section discusses the thesis' main findings in relation to structuration and intersectional theory and previous empirical research. First, the impact of disability in general on various work outcomes is compared to previous research. Second, longitudinal trends in employment outcomes for disabled people are evaluated. Third, the impact of gender is discussed in relation to previous research and to theoretical intersectional literature. Finally, the

importance of education for disabled men and women's work participation and success is discussed considering previous research.

8.2.1 Disability penalty

Findings from study 1 and 2 indicate, as argued in previous research, that disability is a predictor for lower educational attainment, overrepresentation in lower-paying occupations and lower earnings (Raskin 1994; Jain and Verma 1996; Fawcett 2000; Shuey and Jovic 2013; Maroto and Pettinicchio 2014; Longhi, Nicoletti, and Platt 2012). These findings support previous research claiming that disabled people are subject to barriers and various forms of discrimination throughout the educational system, entry into employment and consequent career opportunities (Pettinicchio and Maroto 2017).

Descriptive statistics from study 1 revealed that disabled young people had a lower employment rate (47 %) compared with nondisabled people (72 %). Additionally, the proportion of disabled workers who worked full-time was lower (58 %), than that of nondisabled workers (66 %). The study did not, however, reveal any differences between disabled and nondisabled regarding the proportion of workers with a job relevant to their educational level. Since study 1 performed stratified regression models for disabled and nondisabled people, these findings are descriptive only and have not been tested for statistical significance nor adjusted for variations in individual background characteristics. Discrepancies in employment outcome are likely to vary by, for example, disability type, severity, education and social background. However, the descriptive findings support previous studies which also find a disability penalty related to job-entry and employment rates (Kruse and Schur 2003; Yelin and Trupin 2000; Kuznetsova, Yalcin, and Priestley 2017; Mizunoya and Mitra 2013), and part-time work (Hotchkiss 2004; Schur 2002a; 2003). These findings of low employment rate and more part-time employment among disabled people do not prove, but suggest the presence of hiring discrimination, found in previous experimental studies both in Norway and the US (Ameri et al. 2018; Bjørnshagen and Ugreninov 2021). Several other mechanisms of injustice may also explain disability related inequalities, such as prejudice-based and statistical discrimination, queuing and social closure. A recent Norwegian study by Østerud (2022) provides evidence of such discriminatory mechanisms. The investigated reasons for the exclusion of people with mobility impairments during the first selection stage of a real hiring process. Discrimination was found based on both expected (low) productivity of disabled people, and based on expectations about poor social integration of disabled people in the work-place.

Study 2 found a statistically significant disability wage gap. This gap narrowed when adjusting for educational attainment, occupational representation, and other individual characteristics such as age, working hours, previous work experience, migration background, and family situation, but a statistically significant unexplained disability pay gap remained. These findings support earlier research on income inequalities among disabled people (Longhi, Nicoletti, and Platt 2012; Kruse et al. 2018; Thoursie 2004; Mann and Wittenburg 2015; Maroto and Pettinicchio 2014; Malo and Pagán 2012). A residual pay gap essentially means that a disabled worker is paid a lower wage for performing the same work as a nondisabled worker with the same characteristics. A residual pay gap is a strong indicator of ableism and discrimination in wage setting, as well as devaluation of disabled people's work and work experience (Campbell 2009; P. Cohen and Huffman 2003). The residual wage gap may also reflect internalised ableism, for example if disabled employees show moderation when negotiating wages with employers. Thus, inequality in income may result from the interdependencies both demand- and supply-side factors.

8.2.2 Longitudinal trends

The thesis' findings from study 2 and 3 demonstrate stability in disability penalties, despite a welfare context which has been characterised as favourable for the labour market inclusion of vulnerable groups (van der Wel, Dahl, and Thielen 2011; 2012). Study 2 showed an unexplained disability wage gap, which for men only narrowed slightly over the study period. In study 3, birth cohort was used as a control variable, and showed that younger cohorts were less likely to belong to both unstable and stable work trajectories, and more likely to belong to clusters of social welfare and marginalisation trajectories. This suggests a slight turn towards a less inclusive labour market, with more people on social welfare among younger cohorts. There were no significant differences between cohorts regarding probabilities of belonging to unstable versus stable employment clusters. Overall, the thesis' findings suggest that inequalities are structural and transcend policies and welfare contexts. Practices such as discrimination, ableism, material and social exclusion are repeated and maintained within the social system, reproducing structures of inequality (Giddens 1984).

Evidence from previous longitudinal research investigating disability penalties on employment predominantly also show no change over time (Schumacher and Baldwin 2000; Maroto and Pettinicchio 2015), or even a decline in employment outcomes for disabled people (DeLeire 2000; 2001; Kruse and Schur 2003; Bambra and Pope 2007; Thoursie 2004). Only a few studies were able to document a positive change over time. One example is

Armuor, Button and Hollands (2018) who evaluated the expansion of the ADA in 2009, and found a positive effect on hiring, but only for the disabled people with physical conditions that were less salient to employers.

These current findings suggest that initiatives in the Norwegian context to remove exclusionary barriers to the labour market and inequalities within the labour market have failed. Three explanations for persisting inequalities can be identified in earlier research. First, in the Norwegian context, the absence of formal obligations and sanctions towards employers (Hvinden 2004; Østerud 2021) may be one explanatory factor for persisting inequalities, despite extensive activation policies and employer-engaging efforts from the welfare state (Lundberg and Solvang 2022). Second, anti-discrimination legislation may be ineffective in reducing employment inequalities (Bambra and Pope 2007; Clayton et al. 2012), or even have a negative impact on inclusion. Some scholars have raised the issue of "backlash" following implementation of new disability legislation (J. Grue 2016a, 962). The ADA for examples imposed costly adaptions on employers, leading to a decline in hiring or reduced wages for people with disabilities in the US (Kruse and Schur 2003; Schur et al. 2017; Gunderson and Hyatt 1996). Although the evidence of backlash is mainly from the US context, it could be one of several factors explaining the status-quo seen in Norway.

A third explanation for persisting inequalities may be connected to post-industrialisation theories which postulate marginalisation of disabled workers due to an increasing need for employers with flexibility, specific skills and high productivity levels (Whitehead et al. 2009). Even though previous research suggests that the Scandinavian labour markets are better equipped to protect vulnerable employees (Holland, Burström, et al. 2011), the combined effects of ALMPs and post-industrialisation may result in a status-quo regarding labour market penalties of disabled young people.

8.2.3 Gender

Intersectional theory proposed two main processes that were explored in the thesis' studies. The first is the distortion or interference of disability with able-bodied gender norms, which are hypothesised to influence men stronger than women. The second process is the additive penalties of disability and gender experienced by disabled women.

The current empirical evidence does support a disruption of the male gender at the intersection with disability, as previously suggested (Connell 2005; Mik-Meyer 2015; Ridgeway and Kricheli-Katz 2013). At the same time, the additive disadvantages of disability

and female gender cause disabled women to occupy the least advantageous positions in terms of employment and earnings. In other words, findings indicate that the sum of disability and female penalties experienced by women is larger than the disability penalty experienced by men. Findings demonstrate the intricacies of intersecting social markers. Intersections are not *either* mutually interactional *or* cumulative but may be *both* at the same time.

However, the findings also show that the gendered inequities of the labour market, here exemplified by mechanisms of occupational segregation, hiring and wage discrimination, glass ceiling effects and motherhood penalties, apply equally to disabled women, and that, on a collective level, gender is a stronger predictor than disability for labour market outcome.

The three studies' main findings regarding gender, disability and employment are largely unanimous, despite each study investigating different outcomes using diverse data specifications and methods. Therefore, the main findings regarding gender are reasonably robust, and display gender as a pervasive and transcending dimension of social inequality.

Study 1 found that the disabling effect on employment was stronger for men, than women, resulting in a reduction in the otherwise advantageous male privilege. This evidence supports expectations related to disabling masculinities which suggest disability to be more of a disadvantage for men than for women (Hirschmann 2012; Mik-Meyer 2015; Shuttleworth, Wedgwood, and Wilson 2012). This hypothesis has also found support in several previous quantitative studies (R. Wilkins 2004; Pettinicchio and Maroto 2017; Jones and Wass 2013; Kruse et al. 2018). However, study 1 did not predict outcomes and therefore does not evaluate disabled men and women's labour market success in relation to each other.

Study 2 which also found that the disability penalty on income was stronger for men than women, additionally predicted income for all four groups arriving at a hierarchy of disadvantage where nondisabled men, followed by disabled men had higher income levels than both nondisabled women and disabled women. It is therefore not a paradox that men experience stronger disability penalties, while at the same time being in more advantageous employment and income positions than women. Another finding from study 2 was that the disability penalty of men reduced slightly over the study period, while it remained constant for women. A similar finding was reported by Jones, Latreille and Sloane (2006), who found the disability penalty on wages to drop for men, and increase for women.

Findings of study 2 concur with those of study 3, which found that disabled women were less likely to experience stable employment trajectories, compared with disabled men. The sum of

results indicate that income disadvantages related to female gender pervade and transcend those related to disability status. Consequently, results demonstrate the intersectional complexities of overlapping social strata, documenting distortions of able-bodied (male) gender, while at the same time supporting traditional intersectional expectations. Disabled women experience a greater sum of penalties related to disability and their gender. This corresponds with the majority of previous intersectional quantitative studies of disability, gender and employment (Kim, Skinner, and Parish 2020; Pettinicchio and Maroto 2017; Kim, Parish, and Skinner 2019; Brown and Moloney 2019; Achterberg et al. 2009).

8.2.4 Education

Combined the findings demonstrate that education plays a dual role by both promoting employment and earnings for individuals, while at the same time contributing to enforcing structural inequalities on the collective level. Disabled people's lower educational attainment may come across as a puzzle, given the obvious advantages of higher education to work attainment. However, processes that shape disparities in the labour market may also apply to the educational system, such as physical barriers, social exclusions, discriminatory practices, and lack of appropriate accommodations. Studies have shown that most disabled students experience barriers (physical, digital, financial, accommodation-related and others) to education (Proba 2018; L. P. Grue and Finnvold 2014). The impact of individual resources, aspirations and social background are likely to play a vital role for disabled students' opportunities in the educational system (L. P. Grue and Finnvold 2014).

Current findings are therefore likely to reflect an omitted variable bias since limitations of data availability prevented proper control for individual resources, work capacity, motivations, and aspirations. This selection bias into higher education among disabled people constitutes the educational system as an independent factor which promotes greater disparities between individuals with resources and capacities to enrol and complete education, and individuals without such opportunities.

All the thesis' studies suggest that education is of greater importance for disabled people's labour market participation in relation to nondisabled people. Investigations of both study 1 and 2 echoed earlier findings in documenting disabled people's lower educational attainment as well as the amplified importance of education to disabled people's labour market achievements (Hollenbeck and Kimmel 2008).

Study 3 found that being enrolled in higher education at age 20, as opposed to not being in education at this point, was associated to probabilities of stable employment trajectories (versus unstable trajectories). Starting upper secondary vocational education was related to higher likelihood of stable employment, compared to not being in education at age 20 and to being in academic track. In addition, study 3 suggests that early work experience along-side higher education in most cases lead to stable employment trajectories, reflecting previous research by Connors et al (2014) and Ballo et al. (2022). As pointed out by previous research, higher education is more likely to yield desktop-jobs that are impairment compatible over time, as opposed to physically demanding jobs, which may contribute to deteriorating health (R. Wilkins 2004; Kidd, Sloane, and Ferko 2000; Burker, Sedway, and Carone 2004).

Current findings related to gender differences in the labour market give reason to investigate how the importance of education for work attainment varies by gender. The thesis' empirical analyses found that disabled women benefitted more from education than disabled men (study 1 and 3). In study 1, higher education was found to mitigate the disability disadvantage experienced by women, more strongly, than that of men. In study 3, enrolment in higher education was found to eliminate gender differences in probabilities of stable employment among disabled 20-year-olds. Additionally, study 3 found that men not enrolled in education were more likely to experience stable employment paths than women not enrolled in education; and men in vocational track upper secondary were more likely to experience stable employment than women in vocational track upper secondary. This implies than among disabled young people with no education or vocational education, men are more likely than women to have stable employment trajectories. These results echo findings by Lorentzen and Vogt (2022) and Rousso an Wehmeyer (2001) which suggest that young women skilled in female-dominated trades have less favourable employment trajectories compared with young men skilled in male-dominated trades. Findings also concur with a 2011-study by Doren, Gau and Lindstrom which found that successful completion of vocational rehabilitation significantly related to higher starting wages among disabled men, but not among disabled women.

Study 3 also found that gender differences in stable employment probabilities were eliminated among those young people enrolled in higher education. Thus, higher education can be interpreted to significantly improve disabled women's employment chances, in relation to disabled men, and to smooth out gender differences in employment outcome. This finding appears to contradict previous research which concluded that disabled men experienced

higher pay-offs on wages from education than disabled women (Hollenbeck and Kimmel 2008; Doren, Gau, and Lindstrom 2011). However, the present findings may be an indication of the strong gender inequities of the labour market in favour of men and suggests that education is essential for disabled women to reach the same opportunities for achievements as disabled men. The findings regarding gender displays education as an especially divisive factor for disabled women on a population level, contributing to large disparities in employment, earnings, and financial stability between those with and without education.

8.3 Implications

The findings of this thesis contribute to understanding disability related inequalities in an intersectional framework emphasising the pervasiveness of social structures for unequal access to education and work arenas. The application of structuration theory and intersectional theory to population wide data provides empirical knowledge suited to bring about structural change (Hancock 2007; Ridgeway and Kricheli-Katz 2013). In this section, the implications of the thesis' findings are discussed regarding generalisability, theory, social policy and future research.

8.3.1 External validity

The external validity of the thesis' results can be evaluated in terms of its generalisability to the disabled population on the one hand, and to other welfare contexts on the other.

Due to the inherent heterogeneity and fuzzy boundaries of the disabled category, defining disability – theoretically and empirically – is a complicated endeavour. It is challenging to presume anything certain about the thesis' generalisability to *the disabled population in general.* Still, two factors influencing external validity should be emphasised. First, the empirical operationalisation applied here has no endogenous work-limitation, in contrast to the self-reported disability measures used in the most common surveys. Therefore, the current definition likely includes a larger share of disabled people who do not feel particularly work-restricted by their impairment or illness. This entails that the penalties found here are likely to reflect a smaller average disadvantage compared to studies using self-assessment survey data. Although the exact size of disability penalties found in this thesis may be specific to study design, the patterns of subordination are likely to be generalisable. Second, due to data specification the current findings may not be valid across all subpopulations of disabled young people. As discussed earlier in chapter 5, disabled immigrants and their descendants are severely underrepresented; hence, the thesis' studies provide limited grounds for

concluding that findings are generalisable to the experiences of disabled immigrants and descendants. Further, study design and sample restrictions may oversample people with low socioeconomic status (SES), and oversample people with higher education, as indicated by previous studies (Brekke, Evensen, and Hart 2020; Finnvold 2021). It is also likely that eligible candidates in the highest income brackets are underrepresented as the benefits may be regarded as superfluous. However, the representation of SES in the applied data is difficult to disentangle as disability itself is a predictor for low SES. Finally, statistical findings reflecting group averages are never generalisable to individual experiences. This is an especially important point to emphasise because of the large within-group variance in disability severity.

The main findings' regarding disability related penalties to employment and earnings, and intersectional penalties on disabled women are almost certainly generalisable to *other welfare contexts*. Previous research point towards the comprehensive Scandinavian systems as characterised by lower social inequalities in sickness and lower rates of non-employment (van der Wel, Dahl, and Thielen 2012, 1608). Initiatives to improve labour market participation of disabled people and reduce discrimination have been largely unsuccessful. Inequalities are found significant and stable over time, both in terms of disability and related to female gender. Thus, it is highly unlikely that countries with slimmer welfare regimes and less spending on activation measures display smaller disability-related disadvantages in education and work.

8.3.2 Theoretical implications

The thesis' findings have four important theoretical implications for social inequality research. The first is the use of structuration theory in explaining inequality. The second is the demonstrated importance of studying how disability intersects with gender to produce inequalities. The third implication is related to the dual role of education as a driver of both individual success and collective inequality. The fourth implication relates to gender research in general.

The first implication concerns the use of structuration theory in understanding employment penalties against disabled people. The demonstrated stability of penalties against disabled people over time and across study designs emphasise that disadvantages are not likely to be generated by individual actions, single policies or anecdotal exclusions. Rather, disadvantages are a result of complex interactions between individual agency (both on the supply- and demand-side) and existing social structure. Inequalities are evident across time and space, across various arenas and levels in society. Thus, change is likely to be slow, through

interdependent and mutually transforming processes of individual agency and structure. As a result, the intended effects of policy measures, legislation, and incentives to remove barriers and reduce inequalities will emerge slowly, rather than quickly. Additionally, legislation and policy may have unintended side-effects that outweigh the intended direct effects. The ADA imposing expensive adoptions on employers leading to a reluctance in hiring disable people (Kruse and Schur 2003; Schur et al. 2017; Gunderson and Hyatt 1996) is just one example from the US context.

Second, the application of intersectionality theory to population wide data demonstrates the crucial value of this framework for understanding disability as fluid, flexible, and mutually interacting with gender. The intersectional approach provides empirical evidence of deeply entrenched inequalities related to disability and gender – that proliferate social institutions and create hierarchies of disadvantage. Findings show that intersections are both mutually interactional and cumulative at the same time. Thus, the thesis contributes to expanding the theoretical understanding of disability as a dimension of social inequality, without disregarding its inherent fluidity and heterogeneity.

Third, the role of education in shaping employment opportunities is often understood as a resource and promoter of occupational attainment. The current findings add to the literature exploring how social inequalities are reproduced through the educational system (Strømme and Helland 2020; Helland and Wiborg 2019). For disabled people education is both an individual resource *and* a driver and reinforcer of employment inequalities. Future research which engages with an intersectional perspective to the unequal distribution of educational opportunities among disabled people, can contribute to expanding the understanding of the educational system's dual role in shaping labour market attainment on the individual and group level.

Fourth, this thesis' findings serve as a reminder of the entrenched and persistent gendered structures of the labour market (Blau, Brummund, and Liu 2013; Blau and Kahn 2017), requiring persevering attention from research and policymakers. Regardless of disability, the current findings emphasise a duty of future research to include gender as a dimension in any investigation into labour market participation.

8.3.3 Implications for social policy

In addressing disability as an axis of inequality, this thesis provides knowledge that may spur socio-political mobilisation of resources. The intersecting social divisions and resulting power

structures of disability and gender are expressed in institutions and organisations of society, such as legislation, agencies, unions, companies, voluntary organisations and other associations (Yuval-Davis 2006, 198). Therefore, the current findings have implications for policy regulating and shaping the lives of individuals.

The present findings support previous research which shows that disability limits educational and occupational attainment. Current longitudinal analyses also show that disparities are persistent. This indicates that policy initiatives to reduce discrimination and improve the social exclusion of disabled people have not been successful. The interpretation of current results within a structuration theory framework shows that policies – or rather government strategies – must target long-term outcomes and multiple societal arenas. As part of such a long-term strategy, enforcement of legislation needs to improve, employers must be given more detailed information about requirements to universal access, as well as assistance in improving access. Initiatives to improve the visibility and representation of disabled people across arenas should be politically and financially supported. Bureaucratic procedures and practices that hinder disabled people's participation and opportunities should be reviewed. One example is the municipal organisation of the user-controlled personal assistance (UPA), which may hinder inter-municipal mobility of disabled people.

The lower educational attainment of disabled people is found to be a predictor for lower work attainment and income, both in the present findings and in previous research. An implication for policy is the need to improve access to education and assistance to completion of education for disabled people. Educational institutions must be monitored more closely in terms of compliance with accessibility regulations, since most disabled students report to experience barriers to study progression (Proba 2018). Establishing a right to UPA in the study place, or an educational variation of "functional assistance" (funksjonsassistanse) (NAV 2022a) could be considered. Increased financial support during education could also potentially raise the level of education among disabled people.

8.3.4 Implications for future research

This thesis' findings and limitations provide several interesting opportunities for further research. In the following, seven points of inquiry are suggested.

First, the discussed limitation of the thesis' disability operationalisation calls for further research into longitudinal changes in the composition of recipients of basic and attendance benefits, as well as the implications of change on labour market participation.

Second, lack of data on severity of disability prevented analyses moderated by variations within the disability population. Previous research have found support for moderators by impairment on employment outcome (Pettinicchio and Maroto 2017; Kavanagh et al. 2015; Jones 2011). This should be investigated further using population data to arrive at insights of variations between groups of disabled people.

Third, previous research provides evidence of disabled people crowding in lower-paying low-competence jobs (Thoursie 2004; Maroto and Pettinicchio 2014; Kaye 2009). Findings by Brown and Moloney (2019) also point to significant gender discrepancies in exposure to job-stress among disabled people. Although the studies in this thesis control for either occupation (study 2) or industry (study 1), the representation in occupations, sectors, occupational exposure or precarious working conditions have not been explored. Current findings give reason to anticipate that disabled women are especially disadvantaged in these terms. Further research should address the impact of disability and gender on occupational under- and overrepresentation as well as disabled people's exposure to mechanical and psychological job-stress.

Fourth, it has already been pointed out that longitudinal research on disabled people's labour market participation is scarce. Study 2 of this thesis investigates the disability wage gap longitudinally, but the employment rate of disabled people has not been explored. One finding regarding cohorts from study 3 indicated that that younger cohorts were less likely to have unstable and stable work trajectories, and more likely to have trajectories of social welfare and marginalisation. The question of whether the labour market in recent years has become more or less inclusive of disabled people, needs to be further explored.

The stability in disability penalty found here gives reason to evaluate whether the external "shock" of the covid-19 pandemic and its fundamental impact on working life has impacted disabled workers. Schur, Ameri and Kruse (2020) claim that the pandemic may have a silver lining for workers with disabilities, given the disruption of traditional workplace structures and acceleration of digitalisation in many areas of life including ordering groceries and prescriptions, online health appointments, digital socialisation, telework and remote educational classes. On the contrary, a recent survey study by Maroto, Pettinicchio and Lukk (2021) claim that disabled people may be particularly vulnerable in pandemic times given the increased risk of virus contraction and the pre-pandemic labour market exposures and disadvantages faced by people with disabilities. The impact of the pandemic needs to be

further investigated, both in terms of short- and long-term effects on disabled people's labour market outcomes.

Fifth, the current examinations find female gender to be a strong predictor for labour market disadvantages. Although, studies 1 and 2 in this thesis control for parenthood, they do not examine whether children entail a stronger work or income penalty for disabled women than disabled men. The child penalty has shown to reduce wages and disrupt careers among nondisabled women, with the opposite effect for nondisabled men (Sieppi and Pehkonen 2019; Correll, Benard, and Paik 2007). No previous study could be identified, examining child penalties for disabled workers specifically. Further research should evaluate the child penalty among disabled workers to provide evidence for social policy in supporting disabled parents.

Sixth, intersectional studies emphasise the importance of racial intersections (Maroto, Pettinicchio, and Patterson 2019). Race is a likely factor influencing employment opportunities in Norway (Orupabo and Nadim 2020), and the interactive effects of disability, gender and race have not been studied before in the Nordic context. Data on racial variation is hard to come by in the Scandinavian countries since this is individual information which is neither registered nor asked about in surveys. However, administrative registries include information on country of origin, and parents' country of origin, which could be used as a proxy. Population wide data also provide enough observations and variations to model three-way interactions of gender, disability, and race. The potential disparities and inequalities of people in the disability, gender and race intersection should be further explored.

Seventh, the treatment of gender as a binary category in this thesis obscures the experiences of disabled people with fluid or nongender identities (Brown and Moloney 2019). As register data provide no information on gender beyond biological sex, the qualitative experiences of nonbinary gender subgroups of disabled people should be further explored by means of qualitative methods.

9 Conclusion

This thesis has investigated the labour market participation of disabled people by applying an intersectional approach to disability and gender, and by examining the impact of education by gender for employment outcomes. Limitations of previous research were addressed by employing population wide longitudinal register data.

Disability was found to be a predictor for lower educational attainment, overrepresentation in lower-paying occupations and lower earnings. An unexplained disability wage gap was found to persist over the study period (2005-2017) indicating, although not proving, the presence of discrimination. These findings suggest that disabled people are subject to cumulative exclusions, that is successive additions of discrimination and injustices across education and work arenas, over the life course. The persistence of inequalities found in this thesis may indicate that anti-discrimination initiatives have failed their purpose.

The disability penalty was found to be larger for men, than women, supporting intersectional hypotheses predicting disability to displace male privilege. At the same time, predictions of employment outcome and earnings showed that disabled women had lower occupational attainment than disabled men. This finding supports hypotheses of additive disadvantage experienced by disabled women. However, the dominating factor for their suboptimal outcomes in the labour market is attributed to gender, not disability. Thus, on a collective level, gender is a stronger predictor than disability for labour market outcome.

The thesis found lower educational attainment among disabled people, compared with nondisabled people. Education was a predictor for lower occupational attainment and earnings, however, did not account for the total disability gap. Higher education was found to boost disabled women's chances in the labour market, especially, contributing to eliminating gender differences in likelihood of stable employment trajectories. Among disabled people not in education or in vocational training, men had significantly higher chances of stable employment courses. Gender differences pertaining to educational effects are likely to reflect the gendered structures in the labour market and its mechanisms of rewards. The findings regarding education display the educational system as a promoter of employment, income and careers on an individual level, while simultaneously constituting an independent inequality enforcing factor on the collective level, especially for disabled women.

This thesis contributes to social stratification research by investigating an apparent paradox in intersectional and gender studies: Social markers are described as fluid, flexible, situational,

contextual, and mutually interactional, while at the same time manifesting firm power structures related to male, female, disabled and nondisabled. Current findings demonstrate that although there is evidence supporting theories of disability as contributing to collapsing able-bodied gender norms, gender is here found be a pervasive and transcending hierarchical power structure overriding that of disability. This implies that disabled women on average experience stronger labour market disadvantages, related to female gender, compared with disabled men.

The current findings emphasise the importance of the intersectional perspective to research targeting social structures of power and oppression which limit individuals' opportunities across education and work arenas. This thesis concludes by calling for renewed attention of policymakers to address and review the effectiveness of anti-discrimination legislation and policy aimed at improving access and opportunities for both women and disabled people in both education and in the labour market.

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Study 1

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Labour Market Participation for Young People with Disabilities: The Impact of Gender and Higher Education

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Abstract

To what extent does higher education promote labour market participation for disabled people in school-to-work transitions and early career trajectories? This article argues that the effect of higher education on labour market outcomes for disabled people must be studied in correlation to gender. Intersectional theory warns against the generalisability of the female and male experiences, and predicts that disability may influence sexism, and that gender may influence disableism. Norwegian full-population register data on recipients of disability benefits are used to explore the effect of higher education on three labour market outcomes for men and women with disabilities. Contrary to common intersectionality expectations, the results show that men experience more extreme employment disadvantages related to their disabilities than women. Higher education has a stronger effect on participation for disabled women than for disabled men. However, gender differences in participation are smaller for people with disabilities than for the general population.

Keywords

disability, employment, feminist disability studies, gender, higher education, intersectionality, labour market participation, part-time work, work outcome

Introduction

Previous research has shown that people with disabilities have lower employment rates than the general population, and that women with disabilities are at a particular disadvantage in the labour market (Achterberg et al., 2009; England, 2003; Fawcett, 2000; O'Hara, 2004; Ren et al., 2008). The entry into the labour market is crucial for young

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people with disabilities, in that missing the transition from education to employment increases the chances of permanently remaining outside the labour market (Achterberg et al., 2009: 130; Franzén and Kassman, 2005). Work exclusion has severe and lifelong consequences (Fawcett, 2000; Franzén and Kassman, 2005). Disabled people outside the labour market have lower scores on life quality indicators than the general unemployed population. Not only do 75% of those unemployed with disabilities perceive their financial situation to be less than adequate, but they also feel more like second-rate citizens than the non-disabled population (Legard, 2012: 7–8).

Even though intersectional research on gender, disability and work suggests that disabled women experience discrimination more strongly than disabled men, the existing empirical research is not without ambiguity (Colella and Stone, 2012; Ren et al., 2008). There is a broad range of research on disability and work; however, only a few studies include gender in their analyses (Boman et al., 2014; Kittelsaa et al., 2016; Mik-Meyer, 2015; Randle and Hardy, 2017).

The aim of this study is threefold: (1) to examine the gender differences in labour market participation among young people with disabilities; (2) to study the effect of higher education on labour market participation; and (3) to examine how higher education influences the effect of gender on labour market participation. This article uses an administrative definition of disability, based on registered recipients of disability benefits. An intersectionality approach is applied to full-population register data, and multivariate logistic regression models are estimated on three labour market outcomes: employment, full-time work and job relevance. When combined, the three outcomes measure not only the chances of being inside or outside the labour market, but also the extent of participation and its relevance for individual qualifications. Thus, this study covers both economic and intellectual aspects of work, and produces more robust results as opposed to limiting examinations to one single measure of work participation.

Theoretical framework and hypotheses

This article is theoretically based on feminist disability studies, thereby employing an intersectional perspective. Disability is used to describe the relation between impairments of the individual body and participation restrictions caused by the environment. Hence, the framework aims to combine the so-called *medical model* (see Beaudry, 2016) and the approach known as the *social model* (see, for example, Altman, 2001, 2014; Hanisch, 2011; Oliver, 2013).

More specifically, the analyses rely on the so-called *Nordic relational model of disability*. This theoretical way of reasoning 'approaches the study of disability with three main assumptions: (i) disability is a person–environment mismatch, (ii) disability is situational or contextual; and (iii) disability is relative' (Goodley, 2011: 17). This relational model also provides the rationale for the operational definition in this study, which combines a medical aspect (diagnosis) with a social aspect (practical or financial disadvantage).

Seeing disability as a person–environment mismatch, this study analyses the most well-known finding in the study of disability and employment – that disabled people have lower job prospects than people without disabilities (Achterberg and Yerkes, 2009;

Berthoud, 2008) – as a mismatch in the labour market, specifically related to professional and educational contexts in addition to gender.

Seeing disability as 'situational and contextual', we utilise the concept of intersectionality here to explain how overlapping social identities relate to employment disadvantage (Crenshaw, 1989). This study applies a fundamental dynamic conceptualisation of intersections, as opposed to the purely additive approach. The assumption is that, rather than just being layered on top of each other, multiple social identities may *interact* with each other.

Even if disability may be viewed as relational and usefully analysed in light of intersectional theories, the implications for methodology and research design are not self-explanatory. Intersectional theories have been used in quantitative research (e.g. Covarrubias, 2011; Moodley and Graham, 2015; Veenstra, 2011); however, it is often argued that they are most fruitful in combination with qualitative methods (Bauer, 2014; Bowleg and Bauer, 2016; Hancock, 2007; McCall, 2005). One possible reason for this is that intersectionality is inherently concerned with experiences of individuals, just as the relational model of disability is concerned with a *person*–environment mismatch.

When supported by intersectional theories in investigating how disability is 'relative', it is nevertheless important to remember the power and advantages of quantitative data. To appreciate the usefulness of quantitative data to intersectionality, it is essential to understand how the quantitative approach differs from the qualitative. In McCall's (2005) classification scheme of intersectional research, from anticategorical (individual diversity) at one end of the spectrum, to intracategorical (diversity within groups) in the middle and intercategorical (diversity between groups) at the other end, quantitative research is positioned towards the latter end. The purpose of applying quantitative methods in intersectional research is not to reproduce in-depth knowledge of individual experiences, but rather to reveal patterns of structural disadvantages that generate inequalities (Cole, 2009; McCall, 2005). The power and potential of quantitative intersectionality lies in understanding group-level effects in order to identify group-level policy interventions (Bauer, 2014; Bowleg and Bauer, 2016; Hancock, 2007). The rationale for using quantitative methods in intersectionality is to overcome the limitations of qualitative methods, which Bowleg and Bauer (2016: 338) summarise precisely: 'a myopic focus on the individual fosters primarily individual-level solutions to problems with little or no opportunity to intervene and alter the larger more fundamental roots of structural inequality'.

When developing these theoretical and methodological perspectives into hypotheses, caution is necessary. The link between intersectional theory and the practical application of quantitative methods is still underdeveloped, and many scholars point out the difficulty in interpreting quantitative findings from an intersectional perspective (Bowleg and Bauer, 2016; Dubrow, 2008; Hancock, 2007). These difficulties are often articulated in discussions of the additive and multiplicative approaches (Dubrow, 2008), which is a cul-de-sac for two reasons. First, attempting to directly translate the theoretical meaning of 'additive' and 'multiplicative' to the statistical meaning of the terms (i.e. main effects and interaction effects, respectively) (see Bauer, 2014: 12) creates confusion between theoretical and methodological concepts and, consequently, uncertainty about how regression results should be interpreted. In fact, there are other ways to statistically

model intersecting social identities beyond focusing on main effects and interaction effects. One option is to create dummy variables for groups and subgroups. Another possibility, which this article demonstrates, is to run regressions on separate samples and compare variable coefficients. Therefore, pointing to the limitations of a narrow set of techniques is not very constructive. The problem is rather that previous quantitative studies have failed to communicate clearly how their choice of method and subsequent results relate to intersectional theory.

Second, by focusing merely on the technicalities of quantitative methods, and their failure to capture the experiences of intersectional identities, we risk losing an important opportunity: statistical methods are particularly useful tools 'for revealing patterns of disparity in arenas such as employment and income, physical and mental health, and social life' (Cole, 2009: 177). Therefore, the intersectional contribution of this article is to use quantitative data to unravel structural employment disadvantages for persons belonging to intersecting social groups. Even though the impact of the gender and disability intersection in employment has been analysed qualitatively before (e.g. Mik-Meyer, 2015), there are gaps in the literature related to the overarching population-level outcomes. The size and quality of the data set used here allows for exploring more than one intersection (disability, gender *and* educational attainment) and for observing diversity in inequalities both within and between social groups in the population (see Bauer, 2014: 16). This means that the study is not purely intercategorical, but is rather situated between the intra- and intercategorical points in McCall's (2005) intersectionality scheme.

Without entering into the more complex theoretical debates of feminist theory, it is sufficient to note that the hypotheses in this article are informed by two classical insights from such theories. First, it is assumed that gender is fundamentally interrelated with other categories such as ability, class, sexual orientation, ethnicity and age (McBride et al., 2015; Yuval-Davis, 2006). Second, it is assumed that gender is a hierarchical construct, leaving women at a disadvantage – not least in the labour market (Jones et al., 2006: 411). Various theories have attempted to explain this; for example, the theory of gendered organisations (Acker, 1990) and the theory of the ideal worker (Cooper, 2000: 395 in Randle and Hardy, 2017: 449). This leads to the first hypothesis:

H1: Disabled women experience employment disadvantages more strongly than disabled men.

On the other hand, theories of stereotypical gender perceptions predict that disabled men experience stigmas related to their disability more strongly than disabled women (Deegan, 1985; Mik-Meyer, 2015). This is due to the fact that physical impairments are perceived to be at odds with stereotypical masculine characteristics (e.g. strength, rationality, efficiency) and less contradictory to stereotypical feminine behaviour (e.g. helplessness, emotional sensitivity, weakness, shyness) (Mik-Meyer, 2015: 580–581; Stone and Colella, 1996). The masculine identity – normally a source of employment privilege – is dislodged by the intersection with disability, causing a gendered transformation into stereotypical perceptions of femininity. Thus, it is the disabled man who is '"twice penalized", first by his impairments – his weak and imperfect body – and second or consequently by his "wrong" biological sex' (Mik-Meyer, 2015: 591). In

contrast, the female identity is not distorted by disability in the same way. Therefore, the second hypothesis contradicts the first:

H2: Disabled men experience employment disadvantages more strongly than disabled women.

Higher education is an important predictor for success in the labour market for people, in general, and particularly important for people with disabilities (Bliksvær and Hanssen, 2006; Borg, 2008; Loprest and Maag, 2007; Vedeler and Mossige, 2010). Several studies have found the effect to be twice as strong for disabled people as for the general population, even though both educational and employment levels are lower for people with disabilities (Bliksvær and Hanssen, 2006). However, very little is known about how higher education influences the chances of employment for men versus women with disabilities. Recent research on Norwegian disability employment rates indicates that gender differences are decreasing and that the gender effect in the total population is slightly stronger than in the disabled population (Kittelsaa et al., 2016; Tøssebro and Wik, 2015). At the same time, more women than men with disabilities are pursuing higher education (Kittelsaa et al., 2016), which is the general pattern among non-disabled individuals as well. The fact that education levels among women are increasing and gender differences in employment are decreasing might indicate that women enjoy a stronger education effect on work outcome. A reasonable assumption is that education causes an extra boost in employment chances for groups that are less privileged in the labour market, which leads to the following interactive hypothesis on gender and higher education:

H3: Women with disabilities are likely to experience a stronger positive education effect on work outcome than men with disabilities.

Furthermore, the family life of disabled people is likely to influence participation in paid work, but research is limited on this topic and results are contradictory (Kittelsaa et al., 2016: 50). Kjeldstad and Lyngstad (2011) found that living with a partner and having children strengthens traditional gender roles for people with disabilities, more so than among the general population. Their results indicate that men with disabilities prioritise paid work over household work, while women with disabilities tend to have less paid work in order to have more time and energy for children and homemaking. These effects hold only if just one of the couple is disabled; when both partners are disabled, the division of household work and paid labour is more equal than among the non-disabled population. Another study by Dyck and Jongbloed (2000) found that having a supportive partner at home is conducive to a woman's ability to work in spite of her disability. This article acknowledges that marriage and children are likely to affect work outcomes, but makes no assumptions about the direction of such effect.

Data and methods

The analyses rely on a full-population dataset of Norwegian register data from Statistics Norway, made available through microdata.no, which is a research infrastructure

developed by Statistics Norway and Norwegian Social Science Data Services. Microdata.no includes administrative, educational, financial and welfare data for the entire Norwegian population. An integrated user interface (similar to Stata) allows for statistical analysis. Microdata.no incorporates built-in data protection to avoid compromising the anonymity of individuals in the data. A cross-sectional dataset was extracted for the year 2015, consisting of people who were 20–35 years old in November 2015. This is the most recent year with close-to-full data coverage on all variables of interest. The total number of individuals in the data set is 1,718,712, and 20,207 of these received one or both disability benefits in November 2015. Since the aim is to observe the relationship between education and job outcomes of disabled people in school-to-work transitions and early career trajectories, the age span of interest was set at 20–35 years. Statistical definitions of young people sometimes use a cap of 24 (OECD, youth population: 15–24) or 29 years old (Eurostat young population: 16–29). In this study, however, the cap was pushed to 35 years old because disability may considerably extend the age at which a person completes school. The age limit of 20–35 years excludes most of those who acquired their disability after graduating and those who developed a reduced work capacity as a result of old age. Normally, persons under the age of 20 have not yet made the transition from education to working life (Dag and Kullberg, 2010: 289). At the same time, disabled persons older than 35, who have not yet entered the labour market, are likely to remain outside the labour market (Achterberg et al., 2009: 130). One implication of a focus on young age is that a significant proportion of the population are enrolled in some type of education, which may be a reason for not seeking labour market integration. This potential negative education effect was adjusted for.

Disability

A proxy variable was used to identify people with disabilities: recipients of basic or attendance benefits. Basic benefits are entitlements meant to cover necessary additional expenses incurred due to permanent injuries, illness, disabilities or congenital malformations.[1] Attendance benefits are entitlements for people requiring long-term private care and supervision due to illness, injury or congenital disability. They cover personal assistance, including training and stimulation, but do not cover assistance with household chores. For both basic and attendance benefits the need for additional expenses normally has to last 2–3 years or more. Neither type of benefit is connected to activity requirements such as work or education. Persons with mental health impairments may be eligible for both benefits, accounting for 15–18% of the total number of disability benefit recipients in 2015/2016, according to the Norwegian public welfare agency.

(Self-)employed

A person's status in the labour market is summarised in a dummy variable, coded 1 if a person was employed or self-employed and 0 if a person was unemployed and/or actively seeking work. Economically inactive persons were considered unemployed irrespective of their daily activities: voluntary, educational or other.

Full-time work

Persons who worked 30 hours per week or more were coded 1. Those who worked less than 30 hours a week were coded 0. Unemployed persons were coded missing.

Relevant work

This variable captures the relationship between educational and occupational level. Persons coded 0 were overqualified for their jobs, while persons coded 1 had the same educational level, or less, than what is normally required for their position. The Norwegian standard classification of occupation, STYRK-08 (Statistics Norway, 2011), which has a hierarchical structure where the required level of education is given for each class of occupations, was applied. The occupation variable was coded 1–4 from primary education to higher tertiary education. The educational variable was coded correspondingly, but additionally includes the value 0 for people with no education (Statistics Norway, 2006). Subsequently, comparing educational level to occupational level produced the relevant work variable.

Gender

The effect of gender is captured with a dummy variable, for which women were coded 1 and men 0.

Higher education

A person with at least one year of higher education was coded 1. The value 0 was given to those with less than one year of higher education (Statistics Norway, 2006). The cut-off is at one year to avoid capturing the effect of prolonged studies due to difficulty finding a job.

Control variables

Age was coded in years (20–35). Marital status is provided as a dummy for married and registered partners (1) and everyone else (0). Children is a dummy variable, coded 1 for persons with at least one child (biological or adopted) under the age of 18 living in the same household as at least one of his or her parents. The student variable is a dummy control for persons who were currently enrolled in education on all levels. Individuals may have been working and studying simultaneously. In addition, unobserved heterogeneity across industries was controlled for in models 2 and 3 by adding industry-fixed effects (Statistics Norway, 2007). See the online Appendix (Table A1), and note that the disability distribution across industries was very similar to the full-population distribution.

Logistic regression analysis

The effect of gender and higher education was estimated on the three binary outcome variables using logistic regression (Menard, 2002). In order to compare predictor effects

for the disabled population to those of the general population, separate models were estimated. Industry-fixed effects were added to the models for full-time work and relevant work.[2] Fixed effects were not included in the first model of employment because industries cannot explain probabilities of being employed, since unemployment is unrelated to industry.

The tables report average marginal effects (AME) of the logistic regression models because of the problems associated with interpretation of log-odds ratios (ln-OR) and odds ratios (OR). According to Mood (2010: 67–68), ln-OR and OR cannot be interpreted substantively because: (1) the effects reflect unobserved heterogeneity and (2) the unobserved heterogeneity may vary across samples. Since coefficient effects are compared across models with different populations, AME were used for interpreting and comparing the direction and magnitude of predictor variables. AME express the average effects of variables on the probability of the outcome variable being 1 (see Mood, 2010: 75).

Interpreting interaction effects

The coefficient of the interaction between higher education and gender shows the *difference* between the effect of higher education for women versus men. This means that, when the interaction term is positive, higher education has a stronger effect on women than on men. When the interaction term is negative, the opposite is true. Whenever an interaction term is included, both its constitutive terms must be included as well, in order to avoid biased estimates (Brambor et al., 2006). The coefficients of the constitutive variables are not to be interpreted as direct, unconditional or main effects (Brambor et al., 2006; Kam and Franzese, 2007: 20). The constitutive terms show the effect of each variable when the other is equal to zero. In other words, when the interaction between higher education and gender is included, the coefficient for higher education is the effect of higher education for men, whereas the coefficient for women is the effect of being female for people without higher education. When an interaction term is found to be statistically significant, there are no main effects of its constitutive variables and a model without the interaction is thus a misspecification of the relationships between the two predictor variables and the outcome variable (Brambor et al., 2006).

Results

Descriptive statistics

Table 1 shows the distribution and gender proportions of variables for recipients of disability benefits and for the total population, respectively. The disabled population had a larger share of women (52%) than the total population (45%). This corresponds well to other measurements of disability, which all reflect a higher proportion of women (Molden and Tøssebro, 2012: 349). Less than half of the people with disabilities were employed (47%) as opposed to 72% of the total population. These numbers also correspond well to earlier research on Norwegian disability data, where the employment rates were found to be 42% and 74%, respectively (Falkum and Solberg, 2015). More women (56%) than men with disabilities were working, whereas the opposite was true

Table 1. Descriptive statistics in comparison to total population and gender proportions within each variable (F/M).

	Disability benefit recipients		Total population	
Total *N*	20,207		1,718,712	
	F 52%	M 48%	F 45%	M 55%
(Self-)employed	47%		72%	
	F 56%	M 44%	F 48%	M 52%
Full-time work	53%		66%	
	F 50%	M 50%	F 39%	M 61%
Relevant work	86%		83%	
	F 56%	M 44%	F 52%	M 48%
Higher education	25%		39%	
	F 72%	M 29%	F 60%	M 40%
Married	10%		19%	
	F 69%	M 31%	F 58%	M 42%
Children	29%		37%	
	F 62%	M 38%	F 58%	M 42%
Students	20%		16%	
	F 59%	M 41%	F 54%	M 45%
Age (mean)	26.8		27.9	
	F 27	M 26.6	F 27.7	M 28

Note: Dependent variables in bold.

for the total population (48% female). Fifty-three percent of those who worked and had a disability were working full-time, which overlaps with survey data prevalence: 58% working full-time (Hansen et al., 2011). In comparison, the full-time prevalence among those who worked in the total population was 66%. There was no gender discrepancy in terms of full-time work among the disabled, contrary to that of the total population, where fewer women (39%) worked full-time than men (61%). In both populations, most of the people who were employed had relevant work. Women were less overqualified for their jobs than men, but the gender differences were small. This holds for both the disabled and the total population. Recipients of disability benefits were clearly less educated (25%) than the total population (39%), which is consistent with earlier estimations (Grue and Finnvold, 2014). Of those with higher education among the disabled, 72% were women. In the total population, 60% were women.

The effect of gender and higher education on work outcome

The effect of predictor variables was modelled using logistic regression on three labour market outcomes: employment, full-time work and relevant work. Separate models were estimated for the disability population, comparing results to estimations for the general population. AME and standard errors (SE) were reported; significance levels were

denoted with stars. Models 2 and 3 have added industry-fixed effects, but coefficients were not reported. Results are displayed in Table 2.

Employment. In model 1a, the effect of being female was negative but not statistically significant.[3] The effect of higher education on employment was positive, strong and significant. People with higher education were 36% more likely to participate in the labour market than those who did not have higher education. In contrast to the disabled population, the general population showed a negative and significant employment effect for women (−3.2%). Moreover, the effect of higher education amounted to only roughly a third (13.1%) of the effect for disabled people. In other words, higher education was almost three times as important for disabled people in terms of entering the labour market.

To further evaluate the intersecting effect between gender and higher education, an interaction term was added to the model. The interaction was significant, which means that, although no overall effect of gender on employment was found, there was a statistically significant gender effect among people with higher education. The effect of higher education was 7.2% stronger for women than for men. The AME of women without higher education remained statistically insignificant. The coefficient for higher education showed the effect of higher education for men, which was 31.2%. The effect of higher education for women was 38.4%.[4] To find out if these results were unique to the disabled population, they were compared to those of the general population. Here, the interaction effect was statistically significant with roughly the same strength as in the disability sample (6.2%). The difference was that the effect of being female among people lacking higher education was statistically significant and negative. In other words, women who did not have higher education were less likely to be employed than men without higher education. This negative female effect was not found among the disabled population. Furthermore, the effect of higher education was much smaller among the general population than for people with disabilities: 9.6% for men and 13.8% for women.

To summarise the results from model 1, disabled women with higher education were more likely to be employed than disabled men with higher education. In the general population, the effect of being a woman was *negative* among people without higher education, and positive for people with higher education. In addition, people with disabilities enjoyed three times the effect of higher education on employment than did the general population.

Full-time work. Moving on to model 2, the same predictor variables as above were examined in relation to full-time work. In addition, these models contained dummy effects to control for variations across industries. In model 2a, without the interaction term, women with no higher education were 8% less likely to work full-time than men without higher education. The effect of higher education was positive and significant, but smaller (11.9%) than in the employment model. Results for the full population were similar except that higher education had no effect on probabilities for full-time work.

The interaction effect in model 2b was significant, however, indicating that the effect of higher education on full-time work was 8.5% stronger for women than for men. Among persons without higher education, women were 10.7% less likely to work full-time. The

Table 2. Average marginal effects (AME) of logistic regression of entering employment (model 1), full-time work (model 2) and relevant work (model 3) for disability benefit recipients versus total population.

Average marginal effects on employment

	Model 1a.				Model 1b. Interaction term			
	Disability benefit recipients		Total population		Disability benefit recipients		Total population	
	AME	SE	AME	SE	AME	SE	AME	SE
Women	−0.002	0.006	−0.032**	0.000	−0.015	0.008	−0.051**	0.001
Higher education	0.360**	0.008	0.131**	0.001	0.312**	0.014	0.096**	0.001
Women × higher education					0.072**	0.013	0.062**	0.002
Married	0.137**	0.013	0.012**	0.001	0.138**	0.013	0.012**	0.001
Children	0.084**	0.008	0.031**	0.001	0.084**	0.008	0.031**	0.001
Student	−0.059**	0.009	−0.147**	0.001	−0.122**	0.009	−0.146**	0.001
Age	0.001	0.001	0.006**	0.000	0.002	0.001	0.006**	0.000
N	19,210		1,021,792		19,210		1,021,792	
Log likelihood	−11,927		−552,920		−11,919		−552,360	
Pseudo *R*	0.100		0.059		0.100		0.084	

(Continued)

Table 2. (Continued)

Average marginal effects on full-time work with industry-fixed effects								
	Model 2a.				Model 2b. Interaction term			
	Disability benefit recipients		Total population		Disability benefit recipients		Total population	
	AME	SE	AME	SE	AME	SE	AME	SE
Women	−0.080**	0.010	−0.114**	0.001	−0.107**	0.012	−0.165**	0.001
Higher education	0.119**	0.010	0.000	0.001	0.061**	0.018	−0.077**	0.001
Women × higher education					0.085**	0.021	0.125**	0.002
Married	0.068**	0.014	0.008**	0.001	0.068**	0.014	0.006**	0.001
Children	0.053**	0.010	−0.006**	0.001	0.053**	0.010	−0.003**	0.001
Student	−0.155**	0.011	−0.171**	0.001	−0.151**	0.012	−0.178**	0.001
Age	0.011**	0.001	0.021**	0.000	0.012**	0.001	0.021**	0.000
N	9567		778,709		9567		778,709	
Log likelihood	−5469		−396,354		−5461		−394,324	
Pseudo *R*	0.173		0.208		0.174		0.212	

(Continued)

Table 2. (Continued)

Average marginal effects on relevant work with industry-fixed effects

	Model 3a.				Model 3b. Interaction term			
	Disability benefit recipients		Total population		Disability benefit recipients		Total population	
	AME	SE	AME	SE	AME	SE	AME	SE
Women	0.005	0.007	−0.005**	0.001	−0.000	0.018	−0.017**	0.002
Higher education	−0.351**	0.009	−0.362**	0.001	−0.556**	0.013	−0.368**	0.001
Women × higher education					0.007	0.019	0.014**	0.002
Married	0.024	0.009	−0.014**	0.001	0.024	0.001	−0.014**	0.001
Children	0.015	0.007	0.015**	0.001	0.015	0.007	0.015**	0.001
Student	−0.080**	0.007	−0.084**	0.001	−0.080**	0.007	−0.084**	0.001
Age	0.005**	0.000	0.004**	0.000	0.005**	0.001	0.005**	0.000
N	8362		718,773		8362		718,773	
Log likelihood	−2288		−218,015		−2288		−217,990	
Pseudo *R*	0.333		0.318		0.333		0.318	

Notes: Significance probabilities, *$p < 0.01$, **$p < 0.001$, industry effects for models 2 and 3 not reported

effect of higher education on full-time work for men was 6.1%, while it was more than twice as large for women: 14.6%. Again, women enjoyed a stronger effect of higher education than men on labour market participation. However, among people without higher education, women were doing worse than men. For the general population, the effect of higher education for men was significant and negative (−7.7%). The interaction was significant, and the effect of 12.5% was stronger than among the disabled population. This also entails that non-disabled women, as opposed to non-disabled men, had a positive effect from higher education on full-time work (12.5 − 7.7 = 4.8%). Here, too, the effect of being a woman among people with no higher education was significant and negative (−16.5%).

The essence of model 2 is that the effect of higher education on full-time work was stronger for people with disabilities than for the total population. In addition, the positive effect of higher education was stronger for women than for men, in both populations.

Relevant work. Relevant work was estimated in model 3. The effect of higher education in this model must be interpreted with caution, as educational level is part of the dependent variable. The effect was negative throughout all models. The coefficients of higher education simply reflect that the more education a person had, the more likely it was that he or she would be overqualified. This effect does not reflect a person's position on the career ladder and is not a good predictor of success. Moving on, gender had no effect whatsoever on job relevance for disabled people in model 3a. The total population model showed a significant, though small, overall negative effect of being female (−0.05%).

For the disabled population, the interaction term was not significant, which means that there were no gender differences involved in the likelihood of being overqualified.

Discussion

This article has analysed the effect of gender and higher education on three different employment outcomes. The analyses clearly show that higher education had a stronger effect on employment and full-time work for people with disabilities than it did for the non-disabled population. These results are similar to previous research on the effect of education on employment for people with disabilities (Bliksvær and Hanssen, 2006; Borg, 2008). Still, the effect of higher education should not be over-emphasised, since degree of disability is not controlled for. It is rather likely that those characteristics that increased the chances of graduating from higher education were the same characteristics that increased the chances of labour market success (see 'creaming effect' in Aakvik, 2003). Another likely explanation is that those with higher educational levels had jobs that were less physically demanding and more compatible with declining health (Burker et al., 2004; Kidd et al., 2000).

More interesting than the overall effect of higher education is how higher education intersects with gender. The analyses found that women benefited more from higher education than men, which supports hypothesis 3, that higher education had a stronger effect on women's labour market success. This effect was the same for both the disabled and the total population.

Table 3 summarises the effects of the interaction between women and higher education on the three labour market outcomes. Overall, women with disabilities had equal or

Table 3. The effect of the interaction between being female and higher education on labour market participation.

	Disabled population		**Total population**	
	No higher education	Higher education	No higher education	Higher education
Model 1: Employment	0	+	−	+
Model 2: Full-time work	−	+	−	+
Model 3: Relevant work	0	0	−	+

better chances in the labour market than disabled men. Hypothesis 1, that disabled women are more disadvantaged than disabled men, is not supported. This contradicts most of the earlier empirical research (Achterberg et al., 2009), but rather supports more recent indications that gender equalities among disabled people are decreasing, at least in the Nordic countries (Kittelsaa et al., 2016). Hypothesis 2, predicting that disabled men are more disadvantaged than disabled women, cannot be rejected, even though the results were slightly ambiguous. The empirical analyses do not conclude that disabled women were superior to disabled men, but rather indicate that disability evens out the usual inequality between men and women in the labour market.

There was one situation in which disabled women had lower chances of success than disabled men; namely, full-time work for women without higher education. Part-time work has historically been women's work (Rosenfeld and Birkelund, 1995) and previous quantitative analyses have found that the effect of being female on part-time work is stronger for people with disabilities than for the non-disabled population (Kittelsaa et al., 2016). In the findings, the effect of being a woman on part-time work was stronger for people *without* disabilities; however, the difference in size effect was small.

Although still subject to scholarly debate, part-time work is not necessarily viewed as a drawback (Mósesdóttir and Ellingsæter, 2017). Research has found that part-time work can be a 'bridge' into the labour market rather than a 'trap' for women (Nätti, 1995). In fact, 80% of women in Norway who work part-time do so voluntarily. However, men and women have very different reasons for choosing part-time work, reflecting structural gender inequalities, according to a study of voluntary part-time work in Norway (Egeland and Drange, 2014). Women are three times more likely than men to choose part-time work due to family care and logistics, while men give suboptimal health as the main reason for voluntary part-time work (Egeland and Drange, 2014). The authors suggest that the strong gender segregation of Nordic labour markets may be a factor explaining gender inequalities in part-time work. Men work in the private sector, and women in the public sector, causing a gender gap in wages and a traditional division of care and 'bread-winning' in the family (Borchorst et al., 2012). The empirical results in this article correspond to earlier research on part-time work and gender, even after controlling for industry-fixed effects. Nevertheless, the gender gap was slightly *smaller* for the disabled population than for the general population. Thus, the common intersectional hypothesis of disadvantage due to membership in two subordinate groups is not supported for disabled women in the case of full-time work.

Earlier research on occupational attainment finds negative gender effects for women with disabilities related to job relevance, especially for women with minimum education (Boman et al., 2014). The results in this study do not support this statement, neither for women with higher education nor for women without higher education. Men and women with disabilities had equal chances of securing a relevant job.

Overall, the empirical findings in this study challenge the common hypothesis of intersectional theory, that women with disabilities are being penalised for belonging to two minority groups. Rather, the evidence supports hypotheses of stereotypical gender perspectives that predict that disability is less of a stigma for women than for men, causing gender inequalities to even out among the disabled. Disability may cause distortion of the male identity; depriving disabled men of the privilege it otherwise is to be a man in the labour market. The results indicate that the gendered experience of the disabled man in employment and work situations have nothing in common with the gendered experiences of an able-bodied man. This contradicts earlier research on labour market participation for women with disabilities (O'Hara, 2004), but can be explained by results from research on workplace discrimination. Both Nordic and international research find that stereotypical perceptions of disabled people are more in contrast with masculine characteristics and that men, in general, experience stronger penalties related to the intersection of gender and disability than do women (Colella and Stone, 2012; Mik-Meyer, 2015; Ren et al., 2008; Stone and Colella, 1996).

Conclusion: Contributions, limitations and further research

This article explores the intersectionality of gender and disability and the effect of higher education on labour market participation for men and women with disabilities. The most important contribution to the intersectional literature is the application of intersectional theory to full-population data and the robustness this lends to the quantitative results. The empirical analyses reveal a surprising dynamic between gender and disability, which has previously only been explored qualitatively using small samples. The traditional intersectional hypothesis about double marginalisation is not supported. Quite the contrary, this article concludes that disability harms the male identity more strongly than it does the female identity, resulting in smaller gender inequalities among disabled people than among the general population.

In spite of a rich data set, the unobserved heterogeneity[5] in the disability data is a serious limitation. The dynamic between gender and disability is likely to be affected by whether impairments are visible or hidden and whether the disability is related to physical or mental illnesses. Nevertheless, the results found here represent average robust effects for the *entire* population, including the total population of disability benefit recipients. Rather than being disregarded because of a lack of nuance, the findings should provide a solid ground for further research in which employment outcomes for various types and degrees of disability are explored.

Another limitation is the cross-sectional nature of the data. This excludes possibilities to control for long-term economic inactivity, which has been found to be a strong predictor for unemployment (Franzén and Kassman, 2005). Long-term economic inactivity (more than six months unemployed) may be a source of reverse causation in the first model – the only model including unemployed individuals. However, since results from all

three models point in the same direction, there is no reason to be overly concerned with long-term inactivity being an influential omitted variable. Further longitudinal studies should take care to adjust for long-term inactivity.

The findings in this article point towards greater gender equality, which should inspire further research on gender and career trajectories of disabled people. Currently very little is known about the types of jobs and professional positions for which women and men with disabilities are recruited (England, 2003; Grue and Finnvold, 2014). There is a concern that disabled people, particularly women, are crowding in low-paid and low-status jobs (England, 2003); however, the results found here may indicate otherwise. Further research is needed to explore how the career trajectories of disabled people differ by gender.

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Supplementary material

The supplementary material is available online with the article.

Notes

1. Basic benefits cover expenses related to assistive technology, transport, guide dog, prostheses and special bandages, extra food costs due to dietary restrictions and additional wear on clothes, bed linen and shoes.
2. Coefficients of industry-fixed effects are not reported because they serve to control for unobserved heterogeneity across industries – substantial interpretations of their coefficients do not contribute to explaining gender and educational effects on labour market participation, which is the focus of this article.
3. In the following paragraphs, the term 'significant' is used to mean 'statistically significant'.
4. The effect of higher education for women is the effect of higher education for men, plus the interaction effect: $0.312 + 0.072 = 0.384$.
5. Theoretically, differences between basic and attendance benefit recipients could have been estimated. However, both benefits are granted on the basis of the same long-term or permanent injuries, illnesses or disabilities. Therefore, variations in education and gender effects may as well be greater within, rather than across, the two groups.

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Study 2

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Is the disability wage gap a gendered inequality? Evidence from a 13-year full population study from Norway

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ABSTRACT

Recent research has confirmed the employment disadvantages of disabled people, but disability wage gaps in interaction with gender have not been sufficiently explored. This article asks how the disability wage gap can be accounted for, how the unexplained disability wage gap has evolved over time and how the intersections of disability and gender relate to wage penalties. Norwegian nation-wide annual registry data from the period 2005–2017 (N = 8.5 million) are used to estimate longitudinal pay gaps of disabled men and women in relation to nondisabled workers. The analyses arrive at a persistent residual wage gap for disabled employees. Results confirm that gender is a defining predictor for income, and that disabled women are especially disadvantaged. Implications for intersectional theory are discussed. The current study is a reminder that antidiscrimination legislation and implementation of regulations has not been successful in levelling out injustices experienced by disabled people in the labour market.

1. Introduction

The Sustainable Development Goals (SDGs) adopted by all UN members in 2015, lay out strategies to achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value, by 2030 (Goal 8). The SDGs build upon international developments since the 1980s to promote non-discrimination and inclusion in society for people with disabilities. Despite local and global initiatives, labour market disadvantages of disabled people are widely documented and persistent (Maroto and Pettinicchio, 2014; Pettinicchio and Maroto, 2017; Longhi and Platt, 2012; Kim et al., 2019; Ballo, 2020; Foster and Wass, 2013; Schur et al., 2017; Kruse et al., 2018). Previous studies of inequalities of income have found wage gaps between disabled and nondisabled workers, both before and after controlling for education, occupation, and other personal characteristics (Maroto and Pettinicchio, 2014; Schur et al., 2017; Pettinicchio and Maroto, 2017; Longhi and Platt, 2012). However, quantitative longitudinal research is limited and in part outdated (see DeLeire, 2001; Thoursie, 2004; Pagán-Rodríguez, 2012; Wagner et al., 2005; Kim et al., 2019; Brown and Moloney, 2019). Most of these studies rely on survey data that define disability through self-reporting and as activity limiting conditions. Particularly, longitudinal studies exploring intersectional hierarchies of disability and gender, are scarce. Disability is increasingly viewed as intersectional in nature since disabling processes are essentially intertwined with other social dimensions of inequality, such as gender (Goodley, 2014). The use of intersectional perspectives in studying wage gaps of disabled men and women has the potential to reveal economic inequalities and provide the empirical knowledge needed to improve policy (Robinson, 2018; Hancock, 2007). Nevertheless, the application of intersectionality to quantitative data is uncommon in the disability literature (with few exceptions such as Ballo, 2020; Kim et al., 2019; Brown and Moloney, 2019), due to a persistent tension between the endeavour to expose power inequities between social groups versus the sensitivity to variation within social categories (Robinson, 2018; McBride et al., 2015; McCall, 2005; Hancock, 2007; Naples et al., 2019).

The objective of this paper is twofold. First, the paper addresses limitations of extant literature by employing rich Norwegian full population annual register data (N ≈ 8 500 000) to predict the disability wage gap for men and women over a 13-year period. Analyses apply an administrative operationalization of disability, which does not condition disability on activity limiting impairments. Thus, the current study avoids bias of self-reporting and includes disabled people who may have equal productivity potential as non-disabled people.

Second, the current study contributes theoretically to intersectional research on gender and disability as social categories of structural inequality and power. The study provides novel empirical evidence on

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the collective level about the inequality shaping structures affecting overlapping and interactive social categories of disability and gender.

This study explores the following research questions:

1) Which factors contribute to explain the gross disability wage gap?
2) How has the *unexplained* disability wage gap changed over time?
3) How is the *unexplained* disability wage gap affected by intersectional processes and the gendered structures of the labour market?

Full-population data are not subject to the same insecurities as sampled data. Results from statistical analyses in this article reflect the *actual* working population between 20 and 40 years of age, not a constructed sample. Observable characteristics of individuals are used to explain as much as possible of the disability and gender wage gaps. Explanatory and control variables include own education and parents' education at age 16, years of previous work experience (since 1993), weekly workload, occupation (264 categories), migration background, age, marital status, and parenthood. Thus, the findings of the current study are not just of less uncertainty than previous studies, but also suited to arrive at insights about variations within the disabled population that are otherwise hard to reach with survey data due few observations. Due to the extensive data applied in the analysis, both in terms of number of individuals, length of time-period and detail of explanatory variables, findings provide robust empirical evidence of longitudinal structural inequalities.

As inequalities are expected to rise in the coming years following the covid-19 pandemic, the invasion of Ukraine and its effects on labour markets (e.g., Perry et al., 2021; Qian and Fuller, 2020), disabled people are likely to be particularly vulnerable (Maroto et al., 2021). Thus, targeting explanations for trends in disability-related employment penalties is particularly important. Understanding how disability related disadvantages change over time is essential for the appropriate adaption of policy and regulation aimed to mitigate social injustices.

2. Theoretical and empirical background

This study relies on the idea that disability is socially constructed (Oliver, 1990, 2013). In distinguishing between the medical individual-oriented approach and the social collective-approach to disability, this study acknowledges that it is not the disabled individual who needs fixing. Instead, the way forward is believed to go through policy designed to alleviate the structural disadvantages and injustices of disabled people (Oliver, 1990; Oliver and Barnes, 2012). The implication of the social approach to disability is also "a basic political commitment to improving the lives of disabled people, by promoting social inclusion and removing barriers that oppress disabled people" (Shakespeare, 2013, 2).

2.1. Disability and gender wage gaps

Theories of social inequality as well as extant empirical research describe both disabled people and women as holding disadvantaged positions in the labour market. Previous research has shown that disabled people may encounter barriers to participation in education, in occupations and in sectors of the economy, which may impact their wages negatively compared to their peers (Pettinicchio and Maroto 2017; Maroto and Pettinicchio 2014. Several non-experimental studies suggest that a residual disability wage gap can be attributed to discrimination (see for example Baldwin et al., 2014; Kruse et al., 2018; Longhi and Platt, 2012; Malo et al., 2012). Additionally, experimental studies have documented direct discrimination (although in hiring, not wage setting) using correspondence experiments (see Baert, 2017). In these studies, which have been performed in several countries, fictitious job applications with randomly assigned information on the disability status of applicants—with otherwise equal qualifications—are sent in pairs to employers with job vacancies. Variation in call-back rates between disabled and non-disabled applicants are then measured as discrimination (Bjørnshagen and Ugreninov 2021; L'Horty et al., 2022; Ameri et al., 2018; Stone and Wright, 2013). Discrimination is a key finding from all these studies, and "discrimination in hiring processes is a mechanism through which disability-related inequality in employment outcomes is perpetuated" (Bjørnshagen and Ugreninov 2021, 818). The sum of previous findings indicates the presence of a residual disability wage gap, and that disabled workers are subject to both horizontal segregation (i.e., unequal access to types of occupations) and vertical segregation (i.e., unequal career and wage opportunities within occupations) (Charles, 2003).

Similarly, gender is one of the strongest predictors for high and low-status occupations, stable and unstable employment as well as wage levels (Wagner et al., 2020; Blau and Kahn, 2017). Experimental evidence also strongly suggests the presence of discrimination against women (Blau and Kahn, 2017). Applying a gender perspective to disabled people's income inequalities is therefore inevitable to understand the injustice-promoting structures of the labour market.

2.2. Intersectionality

The analytical framework of intersectionality is well suited to disentangle the intersecting positions of disability and gender as it "recognizes how multiple systems of oppression, […] interact to disseminate disadvantage to and institutionally stratify different groups" (Robinson, 2018, 69). The question remains how these overlapping statuses of disability and gender unfold in relation to wage penalties. Intersectionality theory (Crenshaw, 1989) originally proposed a hierarchy of disadvantages proportional to intersecting statuses of minority and privilege. However, responses to original intersectional conceptualisations suggest that gendered performances may "break down" or become "distorted" when they coincide with other minority statuses such as disability (Connell, 2005; Ridgeway and Kricheli-Katz, 2013). The well-documented gender bias in the labour market suggests that disabled women are subjects of "twice penalization" (O'Hara, 2004) or even "two handicaps plus" (Hanna and Rogovsky, 1991), as they confront both sexism, ableism and a female/disabled plus factor. On the other hand, qualitative intersectional research has demonstrated how disability breaks down gendered performances jeopardising traditional expectations to gender in the labour market, producing "disabling masculinities" (Kavanagh et al., 2015; Mik-Meyer, 2015; Shuttleworth et al., 2012).

These two contradicting processes lead to two main hypotheses. First, theories of gendered structures of work propose that gender is the dominating structure of inequity, overruling disabling processes, rendering disabled women with lower wages compared with disabled men. Second, theories of disabling masculinities suggest that disability penalties are stronger for men than women. These two hypotheses do in fact not contradict one another, as it is possible that disabled women have lower predicted earnings than disabled men, while at the same time the disability wage gap is larger among men than women.

When considering evidence from both international and Nordic research about segmentation of women in the labour market and the attached disadvantages (Charles and Grusky, 2004; Blau and Kahn, 2017), including the motherhood penalty and its consequences on wages (Sieppi and Pehkonen, 2019; Correll et al., 2007) as well as women's opportunities to negotiate own salaries (Babcock and Laschever, 2003), the current study expects to find disabled women on the bottom of the wage ladder. However, whether men experience a stronger disability penalty than women, remains an open empirical question.

2.3. Longitudinal trends

There are two long-term structural trends that are important in shaping expectations to how the residual disability wage gap has developed over time. The first is the international development of anti-

discrimination legislation and social regulation (Clayton et al., 2012b; Tøssebro, 2016). The second is the changing nature of work, away from manual labour towards new technology and digitalization (Jones and Wass, 2013), and related theories of post-industrialization (Holland et al., 2011). International bodies such as UN, EU and OECD have in recent decades developed initiatives, policies, regulation, and legislation aimed to improve the social inclusion of disabled people and mitigate discrimination (Clayton et al., 2012b; Tøssebro, 2016).

Although anti-discrimination legislation is designed to eliminate injustices against disabled people, some scholars argue that the increased costs associated with requirements to offer adequate accommodations have made employers more reluctant to hire disabled people (Acemoglu and Angrist, 2001). Others have argued that the effectiveness of legislation is largely dependent on individuals enforcing their rights – a capacity not evenly distributed in the population (Dickens, 2007). In Scandinavia, however, systematic evidence of regulation effectiveness is lacking (Tøssebro, 2016).

Paralleling the implementation of anti-discrimination regulation has been the changing nature of work from manual labour towards increasing digitalization of work and increasing work hour flexibility. It has been suggested that this shift is especially beneficial for disabled workers (Jones and Wass, 2013), improving productivity and access to occupations that were previously out of reach. Recent pandemic research proposes a potential "silver lining" for workers with disability in the pandemic induced reformations of workplaces such as increased access to home office and new ways of thinking about the performance of work tasks (Schur et al., 2020). On the other hand, theories of post-industrialization (i.e., higher demands for flexibility, skills, credentials, performance, capacity, and productivity) suggest that people with productivity limitations are more vulnerable to labour market exclusion because they are less able to meet demands and requirements. This hypothesis has been partially supported by results indicating growing employment polarization between nondisabled and disabled people (Whitehead et al., 2009).

Taken together, the gradual implementation of anti-discrimination regulation, post-industrialization and the digitalization of working life leads to an expectation that the residual disability wage gap is narrowing over the study period. However, trends are likely to differ by gender, since men and women to a large extent work in different sectors with differing opportunities for career and wage progression. Given the polarization of the wage distribution (Asplund et al., 2011), it is likely that workers in higher wage brackets – mostly men – experienced a widening of the disability wage gap, since discretion in wage setting is larger at the top of the wage distribution than at the bottom.

2.4. Study context

The Norwegian welfare state is known for its generous social benefits and comprehensive activation policies aimed at supporting and incentivising labour market participation (Hvinden, 2004). Generous social benefits lower the opportunity cost of work and may disincentivise employment, but in a setting of compressed wage structure the lowest wages are likely to be high enough for people to seek work. On the other hand, the relatively high wages at the bottom may still make employers reluctant to hire jobseekers that come with a risk of low productivity (Halvorsen et al., 2016). In an international comparative study, the Nordic welfare model was not found "systematically worse" in terms of employment of disabled people, than other types of welfare regimes (Halvorsen et al., 2016, 69).

Additionally, the Norwegian model is characterized by gender equality policies and high rates of female labour force participation. Norway is together with Finland and Iceland among the countries with the smallest gender gaps in the workforce (World Economic Forum, 2022), but the Norwegian labour market is highly gender segregated and gender wage gaps persist (Ellingsæter, 2013; Reisel et al., 2019).

3. Methodology

3.1. Data

The analyses rely on nation-wide Norwegian administrative data from various population registries (such as tax, income, welfare benefits, education, and demographics) and matched on a personal identification number. Thus, providing exact individual level observed information across registries. The use of administrative data in the current study was approved in compliance with the general data protection regulation (GDPR) of the EU, by the Norwegian Agency for Shared Services in Eduction and Research (SIKT).

The dataset consists of all working individuals from cohorts 1974 to 1997 who were between the ages 20 and 40 between 2005 and 2017 residing in Norway with a registered annual income of at least 0.5 price-based amounts (PBA). Employees with income from sheltered work were excluded. Income is calculated in terms of PBA to adjust for changes in inflation and growth of wages. PBA is a fixed annual amount used to calculate applicability and level of welfare benefits, pensions, and student allowances in Norway. The amount is adjusted annually to reflect expected wage growth and adjusted for discrepancies between expected and actual growth during the last year. The cut-off at 0.5 PBA used here for labour market participation is considered the limit for economic marginalisation in several existing studies (Bäckman and Nilsson, 2016; Vogt et al., 2020; Widding-Havnerås, 2016).

The operationalization of disability is done by a binary proxy variable of recipients of at least one of two disability related benefits; basic benefit and attendance benefit. Basic benefits are entitlements meant to cover necessary additional expenses incurred due to permanent injuries, illness, disabilities, or congenital malformations. They cover expenses related to assistive technology, transport, guide dog, prostheses and special bandages, extra food costs due to dietary restrictions and additional wear on clothes, bed linen and shoes. Attendance benefits are entitlements for people requiring long-term private care and supervision due to illness, injury, or congenital disability. They cover personal assistance, including training and stimulation, but do not cover assistance with household chores. These benefits are not connected to activity limitations or requirements and are not meant to cover ordinary living expenses or be an alternative to employment. Entitlements are not mutually exclusive, and they cover both physical and mental illnesses and impairments. The most common diagnoses include, but are not limited to, mental illnesses and behavioural disorders, illnesses of the digestive, skeletal, and muscular systems, skin diseases, congenital malformations including chromosomal mutations, as well as injuries.

To filter out persons who acquired disability because of their work arrangement, or due to old age, only individuals who started receiving disability benefits before the age of 20 were defined as disabled for as long as they continued to receive benefits. Thus, the dataset was limited to young age and long-term disabled. Persons who migrated to Norway after turning 20 years are excluded from the dataset because of missing information on disability status before the age of 20. Persons who died or emigrated before or during 2017 were excluded altogether.

3.2. Analytical approach

The empirical analysis was initiated by a presentation of descriptive statistics of dependent, independent and control variables.

Log-linear regression models were estimated on income observed between 2005 and 2017 to test the relationship between disability and income, explore the explanatory power of variation in education and occupation, while controlling for relevant background characteristics. Control variables include age, year, work hours per week (intervals), number of years with work experience since 1993, migration background, parents' education at age 16, marital status and parenthood. Table 1 displays operationalizations of all dependent and independent variables.

Table 1
Operationalisations of variables.

Variables	Operationalization	Values
Dependent variable		
Annual labour market income	Sum of wages, taxable benefits, sick pay and parental benefits	Natural logarithm of amount in NOK
Independent variables		
Disability	Long-term recipients of basic and/or attendance benefits since before age 20	0/1
Education	Highest completed educational level. Higher education (MA/PhD) (1), higher education (BA or lower) (2), secondary school (3) and primary school (4), no education (5), unknown education (9), (Statistics Norway, 2006).	Categorical: 1–5, 9
Occupation	Categorical variable of occupations based on the International Standard Classification of Occupations (ISCO-98), (Statistics Norway, 2011)	Three-digit categorical variable, 279 categories
Control variables		
Women	Women 1, men 0	0/1
Parenthood	One or more children below 18 living in the same household	0/1
Marital status	Persons with a registered spouse or cohabitant	0/1
Migration background	Individuals themselves or both of their parents born outside of EU/EEA, USA, Canada, Australia and New Zealand	0/1
Workload	Weekly hours agreed upon in a person's work contract. Overtime, sick leave, holidays excluded. 4-19,9 (1), 20–29,9 (2), 30+ (3)	Categorical: 1-3
Work experience	Total number of years with income above 0.5 PBA annually since 1993	0–25
Age	Continuous in years	20–40
Parents education at age 16	Highest level of education of mother, father, or both. Higher education (MA/PhD) (1), higher education (BA or lower) (2), secondary education (3) and primary school (4), no education (5), unknown education (9), Statistics Norway, 2006()	Categorical: 1–5, 9

Log-linear regression means that the dependent variable income is transformed to its natural logarithm, whereas the independent variables are in their original form. This has the advantage that the usual right skewed distribution of income is accounted for, but also that regression coefficients can be interpreted as change in percentage probabilities when the formula e^b-1 is applied (Stock and Watson, 2020).

An interaction between disability and time using year as a continuous variable, served to test whether a longitudinal change in wage gap could be observed. Additionally, a final model with a three-way interaction between disability, time and gender was estimated to test whether longitudinal trends in the disability wage gap differed between men and women. The disability wage gap was visualized over time by plotting the predicted log of income between 2005 and 2017 with independent variables at means first by disability, and then by disability and gender.

4. Results

4.1. Descriptive results

Table 2 displays descriptive statistics of the study data. The number of observations defined as disabled was 23 508, amounting to 0.28 percent of the total dataset of 8.5 million observations. Disabled workers in general were characterized by lower educational levels. Only seven percent had higher education beyond a bachelor's degree (BA), as opposed to ten percent in the general population. Twenty-four percent of the disabled population had higher education at the BA level as their highest educational level, as opposed to 31 percent in the general population. This is surprising since higher education in Norway is tuition free, as opposed to countries such as the UK and USA. Thus, higher education in Norway is not an expensive investment followed by the potential risk of unemployment, which may cause disabled people to opt out of higher education due to potential double burden of having educational debt *and* no income. The educational level of parents was approximately the same for disabled and nondisabled people. Disabled workers to a greater degree hold part-time (as opposed to full-time) jobs compared to nondisabled. Among the disabled, 64 percent work 30 h or more per week, while the share among nondisabled was 75 percent.

4.2. Log-linear regression models

Model 1 (Table 3) estimates the unadjusted disability related income gap, which is 26 percent (e^b-1). In model 2 education is added as explanatory variable, reducing the income gap to 23 percent, and increasing adjusted R^2 from 0.001 to 0.065. Education is categorical with long higher education as the reference category. The education coefficients indicate that long higher education is related to higher income than any lower educational levels.

Model 3 (Table 4) includes absorbed occupation dummies (264 categories) in addition to education, which reduces the disability wage gap to 18 percent and increases adjusted R^2 from 0.065 to 0.301. In model 4, control variables are added to adjust for time and differences in individual background characteristics. The adjusted disability wage gap is estimated to five percent in model 4. Comparatively, the gender wage gap is estimated to eight percent. Substantially, the adjusted disability wage gap entails that a disabled person earns 95 percent of the nondisabled person's salary in the same occupation with the same educational level, everything else held constant. In other words, the five percent disability wage gap cannot be explained by variations in occupation, education, gender, previous work experience, weekly workload, migration background, age, marital status, parenthood, or parental educational level.

To estimate the longitudinal trend in the unexplained disability wage gap, an interaction term between disability and year is added in model 5 (see Table 5). The disability coefficient represents the adjusted wage gap in the starting year 2005. The coefficient for year represents the annual increase in wages for every individual in the model. The interaction term represents the difference in annual change in income between the nondisabled and the disabled individuals. The interaction term is positive and statistically significant ($p < 0.05$). However, since the estimate is negligible (0.2 percent per year), the substantial interpretation is that the disability wage gap is stable and persistent. The longitudinal trend is plotted in Fig. 1.

Finally, due to the strong gender-related inequalities of the labour market, the log-linear interaction model is fitted with a three-way interaction between disability, year, and gender. The three-way interaction serves two purposes: 1) to estimate differences in wage levels between disabled and non-disabled men and women, and 2) to test whether there is a gender difference in *the stability of the disability wage gap*. Results are displayed in Table 6 and plotted in Fig. 2. The results show that the disability pay gap is larger among men, than women. Model 6 confirms that the disability wage gap remains stable over the study period, and the three-way interaction estimate with a p-value of 0.525 demonstrates that the disability wage gap remains substantially unchanged for both men and women (i.e., there is no gender difference in change over time). Further, men's predicted income is at an overall higher level than both disabled and nondisabled women, as shown in Fig. 2.

Table 2
Descriptive statistics of dataset.

	Disabled				Nondisabled			
	N		%		N		%	
Total	23 508		0,28%		8 489 594		99,78%	
Education								
Higher education (MA/PhD)	1576		7%		876 111		10%	
Higher education (BA)	5736		24%		2 629 084		31%	
Secondary school	9632		41%		3 608 666		43%	
Primary school	6480		28%		1 368 371		16%	
Unknown education	84		0%		7362		0%	
Parents' education at age 16								
Higher education (MA/PhD)	1935		8%		769 965		9%	
Higher education (BA)	6673		28%		2 248 270		26%	
Secondary school	12 399		53%		4 461 367		53%	
Primary school	2479		11%		980 991		12%	
Unknown education	22		0%		29 001		0%	
Weekly workload								
***4-19,*9 h**	6425		27%		1 369 406		16%	
***20-29,*9 h**	2156		9%		730 463		9%	
30 h *or more*	14 928		64%		6 362 725		75%	
Female	11 418		49%		4 113 514		48%	
Married/cohabitant	2687		11%		1 756 790		21%	
Parenthood	8366		36%		3 814 954		45%	
Migration background	1412		6%		546 637		6%	
	Mean	**St. dev**	**Min**	**Max**	**Mean**	**St. dev**	**Min**	**Max**
Log of income	12.44	0.73	10.32	15.22	12.75	0.66	10.32	17.45
Years of work exp. since 1993	7.15	4.59	0	24	10.22	5.22	0	25
Age	26	5.12	20	40	29	5.44	20	40

Table 3
Log-linear regression models of income.

	Model 1				Model 2 + education			
		N	8 513 102			N	8 513 102	
		Adjusted R2	0.001			Adjusted R2	0.065	
	b	p	CI (95%)		b	p	CI (95%)	
Disabled	−0.303	<0.001	−0.311	−0.295	−0.260	<0.001	−0.269	−0.252
Education (ref. Higher education (MA/PhD))								
Higher education (BA)					−0.394	<0.001	−0.400	−0.393
Secondary school					−0.479	<0.001	−0.480	−0.477
Primary school					−0.643	<0.001	−0.645	−0.641
Unknown education					−0.760	<0.001	−0.774	−0.745

5. Discussion

The objective of this study was threefold: 1) to investigate explanatory factors of the disability wage gap; 2) explore how the unexplained residual wage gap has developed over time; and 3) to study how the unexplained disability wage gap is affected by intersectional processes and the gendered inequalities of the labour market. To answer these questions, log-linear regression analyses were applied to longitudinal full-population registry data. The investigations arrived at three main findings:

1) Educational attainment, occupational representation, and other individual characteristics contributed to reducing the gross disability wage gap, but a statistically significant unexplained disability pay gap remained.
2) The unexplained pay gap persisted over the study period for both men and women.
3) The disability related pay gap was larger for men, in relation to women.

The first finding relates to the determinants of the disability wage gap. Regression models confirm that lower educational attainment is a precursor for lower wages among disabled workers, which echoes earlier findings (Kruse et al., 2018; Jones and Wass, 2013). The reduction of the disability pay gap when adding occupational fixed effects to the regression models indicated an occupational segmentation of disabled workers in low-income jobs, a concern that has been raised in previous research (Raskin, 1994; Jain and Verma, 1996; Fawcett, 2000; Shuey and Jovic, 2013). Nevertheless, the unexplained disability pay gap supports initial expectations that observed variables provide insufficient explanation for the inequalities experience by disabled workers. The implication of these findings is that income inequality exists both between occupations and within occupations and confirm that disabled people experience both horizontal segregation (i.e., unequal access to types of occupations) and vertical segregation (i.e., unequal career opportunities within occupations) (Charles, 2003; Player et al., 2019). This finding concurs with research produced two decades ago, which concluded that disabled workers were more likely to remain in non-managerial positions with low potential for upward social mobility, compared to nondisabled workers (England, 2003; Stevens, 2002). Similar tendencies were found more recently by Richards and Sang (2019) who revealed that disabled people were given minimal workplace adjustments but at the same time measured against able-bodied co-workers. Additionally, disabled workers were less likely to be encouraged into better quality and better paid jobs and they benefited very little from long-term employment experiences, mainly because of

Table 4
Log-linear regression models of income.

	Model 3 + occupation				Model 4 + individual background			
		N	8 513 102			N	8 513 102	
		Adjusted R2	0.301			Adjusted R2	0.580	
	Absorbed occupation dummies (264 categories)				Absorbed occupation dummies (264 categories)			
	b	p	CI (95%)		b	p	CI (95%)	
Disabled	−0.200	<0.001	−0.208	−0.913	−0.046	<0.001	−0.051	−0.040
Year					0.026	<0.001	0.026	0.026
Education (ref. higher education (MA/PhD))								
Higher education (BA)	−0.232	<0.001	−0.234	−0.231	−0.180	<0.001	−0.181	−0.179
Secondary school	−0.167	<0.001	−0.168	−0.165	−0.165	<0.001	−0.166	−0.164
Primary school	−0.260	<0.001	−0.262	−0.258	−0.207	<0.001	−0.209	−0.206
Unknown education	−0.328	<0.001	−0.341	−0.316	−0.173	<0.001	−0.183	−0.164
Female					−0.079	<0.001	−0.079	−0.078
Years of work exp. since 1993					0.042	<0.001	0.042	0.042
Weekly workload (ref 4–19,9 h)								
20-29,**9 h**					0.365	<0.001	0.364	0.366
30 h *or more*					0.615	<0.001	0.614	0.616
Migration background					−0.006	<0.001	−0.008	−0.005
Age					0.001	<0.001	0.001	0.001
Married/cohabitant					0.044	<0.001	0.043	0.045
Parenthood					−0.018	<0.001	−0.019	−0.017
Parents' educational level at age 16 (ref. higher education (MA/PhD))								
Higher education (BA)					0.021	<0.001	0.020	0.022
Secondary school					0.048	<0.001	0.047	0.049
Primary school					0.053	<0.001	0.052	0.055
Unknown education					0.075	<0.001	0.070	0.080

Table 5
Log-linear regression model of income.

	Model 5 + interaction with year			
		N	8 513 102	
		Adjusted R2	0.580	
	Absorbed occupation dummies (264 categories)			
	b	p	CI (95%)	
Disabled	−0.058	<0.001	−0.071	−0.046
Year	0.026	<0.001	0.026	0.026
Disabled X Year	0.002	0.026	0.000	0.003
Education (ref. higher education (MA/PhD))				
Higher education (BA)	−0.180	<0.001	−0.181	−0.179
Secondary school	−0.165	<0.001	−0.166	−0.164
Primary school	−0.207	<0.001	−0.209	−0.206
Unknown education	−0.173	<0.001	−0.183	−0.164
Female	−0.079	<0.001	−0.080	−0.078
Years of work exp. since 1993	0.042	<0.001	0.042	0.042
Weekly workload (ref 4–19,9 h)				
20-29,**9 h**	0.365	<0.001	0.364	0.366
30 h *or more*	0.615	<0.001	0.614	0.616
Migration background	−0.006	<0.001	−0.008	−0.005
Age	0.001	<0.001	0.001	0.001
Married/cohabitant	0.044	<0.001	0.043	0.045
Parenthood	−0.018	<0.001	−0.019	−0.017
Parents' educational level at age 16 (ref. higher education (MA/PhD))				
Higher education (BA)	0.021	<0.001	0.020	0.022
Secondary school	0.048	<0.001	0.047	0.049
Primary school	0.053	<0.001	0.052	0.055
Unknown education	0.075	<0.001	0.070	0.080

employer barriers (Richards and Sang, 2019).

The presence of an unexplained disability wage gap in current results, indicates – though it does not prove – the presence of wage discrimination. Since models control for previous work experience, it is probable that disabled workers are subject to valuation discrimination both in terms of current work and past work. Qualitative research on disabled workers in high-ranking positions found a lack of acknowledgment and feedback on contributions and existing performance of workers, which the authors claim, "jeopardizes chances to improve performance and therefore access to promotion" (Wilson-Kovacs et al., 2008, 714). Claims of wage discrimination is further supported by recent

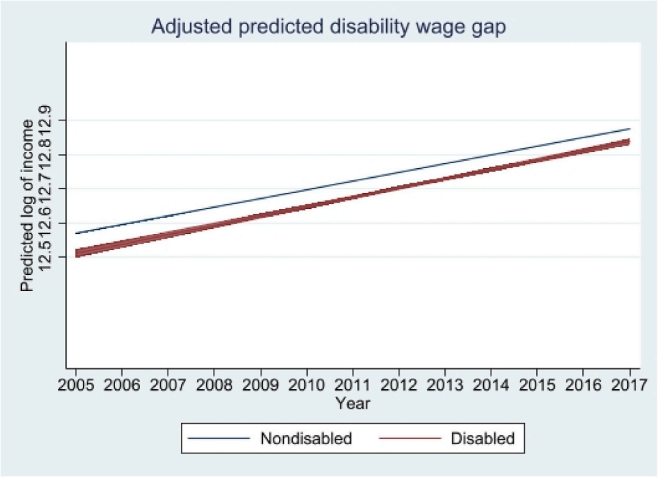

Fig. 1. Predicted log of income for nondisabled and disabled between 2005 and 2017.

experimental research from the Norwegian context, as well as other welfare contexts, revealing the presence of discrimination in hiring processes (Bjørnshagen and Ugreninov 2021; Østerud, 2022; L'Horty et al., 2022; Ameri et al., 2018; Stone and Wright, 2013), which may have bearing on earnings.

Another factor related to discrimination is the possibility that the cost of accommodations in the workplace may be allocated to the individuals in the form of lower wages, as discussed by Blanck et al. (2003, 267): "the individual, more than the employer, will pay for her own accommodation. If the cost of the accommodation to the individual is too large, she is unlikely to enter the labour market". A likely consequence is that disabled workers may be less firm in salary negotiations if their employment entails costly accommodations for the employer.

The second finding relates to the gender differentials in the disability wage gap. The disability wage penalty was stronger for disabled men, in relation to disabled women. Similar results were reported by Jones and Wass (2013) who found that the employment gap of disabled men

Table 6
Log-linear regression of income with three-way interaction between disability, year and gender.

	Model 6: Three-way interaction			
		N	8 513 102	
		Adjusted R2	0.580	
	Absorbed occupation dummies (264 categories)			
	b	p	CI (95%)	
Disabled	−0.083	<0.001	−0.100	−0.066
Year	0.026	<0.001	0.026	0.026
Female	−0.072	<0.001	−0.074	−0.071
Disabled X Year	0.002	0.064	−0.000	0.004
Disabled X Female	0.054	<0.001	0.029	0.079
Female X Year	−0.001	<0.001	−0.001	−0.001
Disabled X Year X Female	−0.001	0.525	−0.004	0.002
Education (ref. higher education (MA/PhD)				
Higher education (BA)	−0.180	<0.001	−0.181	−0.179
Secondary school	−0.165	<0.001	−0.166	−0.164
Primary school	−0.207	<0.001	−0.209	−0.206
Unknown education	−0.174	<0.001	−0.183	−0.164
Years of work exp. since 1993	0.042	<0.001	0.042	0.042
Weekly workload (ref 4–19,9 h)				
***20-29,9* h**	0.365	<0.001	0.364	0.366
30 h *or more*	0.615	<0.001	0.614	0.616
Migration background	−0.006	<0.001	−0.008	−0.005
Age	0.001	<0.001	0.001	0.001
Married/cohabitant	0.044	<0.001	0.043	0.045
Parenthood	−0.018	<0.001	−0.019	−0.017
Parents' educational level at age 16 (ref. higher education (MA/PhD))				
Higher education (BA)	0.021	<0.001	0.020	0.022
Secondary school	0.048	<0.001	0.047	0.049
Primary school	0.053	<0.001	0.052	0.055
Unknown education	0.075	<0.001	0.070	0.080

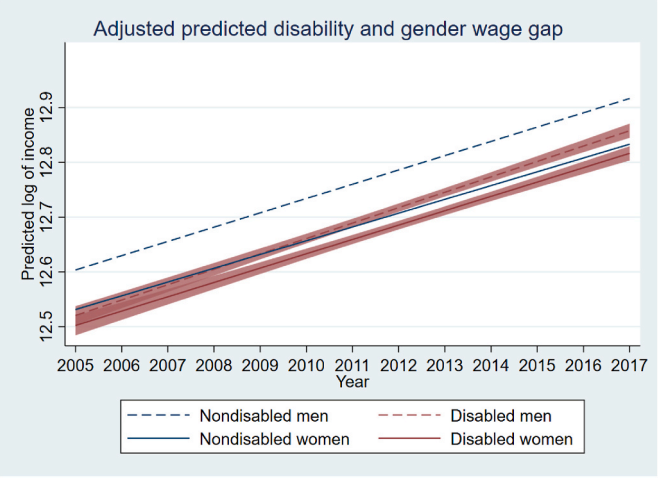

Fig. 2. Predicted log of income for nondisabled and disabled men and women.

exceeded that of disabled women; and Kruse with colleagues (2018) who found that disability related pay gaps were stronger for men. These findings may reflect a disruption of the male gender at the intersection with disability, as some scholars have suggested (Connell, 2005; Mik--Meyer, 2015; Ridgeway and Kricheli-Katz, 2013).

One other reason why men experience a larger disability penalty than women may be that the wage scale is less compressed in high-status well-paying male occupations than in typical low-competence female occupations (Statistics Norway, 2020). Therefore, both disabled and nondisabled men still have higher predicted earnings than women – disabled or not.

The gender differential results from the current study confirm expectations that disabled women experience additive career and income penalties related to disability and their gender, which corresponds to former intersectional studies of disability, gender, and employment outcomes (Pettinicchio and Maroto, 2017; Kim et al., 2019, 2020; Brown and Moloney, 2019). It is evident that even though men may experience stronger disability penalties than women, disabled workers – like nondisabled workers – are subject to the same gender-inequity producing structures of the labour market which – on the macro-level – favour men. These findings, which show that the intersections between disability and gender are both mutually interactional (i.e., disrupting male privilege) and additive at the same time, contribute to a more nuanced understanding of intersectional processes.

The third finding concerns the persistence of the unexplained disability wage gap over time. A residual disability wage gap remained unchanged for both men and women during the study period. These results suggest that global initiatives such as the SDGs or national anti-discrimination legislation have not yet been successful in eliminating inequalities. Evidence from previous research provide reason to believe that anti-discrimination legislation may be ineffective in reducing employment inequalities (Bambra and Pope, 2007; Clayton et al., 2012a) or may even cause a "backlash" (Grue, 2016, 962) if costly mandatory adaptions are perceived as entailing high risk hires for employers (Kruse and Schur, 2003; Schur et al., 2017; Gunderson and Hyatt, Douglas, 1996).

Post-industrialization theories may also explain the status quo: disabled jobseekers are seen as less attractive employers against increasing needs for flexibility, specific skills, and high productivity levels (Whitehead et al., 2009). Another factor contributing to persistent inequalities may be that the use of new technology has *both* enabling and disabling effects on disabled people (Shakespeare et al., 2022; Schur et al., 2020). Post-pandemic research has for example examined the potential gains for disabled people of covid-induced acceleration in digitalization of working life. These studies on the one hand disseminate concerns that new technology may limit efforts to include disabled people in other ways, and thus lead to increased exclusion of disabled people (Shakespeare et al., 2022), and other hand, show that employment rates of disabled people grew more quickly during the post-covid economic recovery than among non-disabled (Ne'eman and Maestas, 2022). These employment gains were mostly in telework and non-frontline occupations, suggesting that new and more flexible ways of working have benefitted disabled people disproportionately.

Results of the current study should be interpreted within the Norwegian welfare context. Nevertheless, although the exact size of disability penalties found here may be specific to study design and context, the patterns of subordination are almost certainly applicable to other contexts. Two factors influencing external validity can be mentioned: First, the disability definition has no endogenous work-limitation, in contrast to disability measures used in the most common surveys. This implies that wage gaps found here are likely to reflect smaller differences compared to studies using survey data. Second, as previous research has found limited or no impact of social policy and regulation in reducing inequalities, it is unlikely that countries with smaller welfare regimes produce smaller disability-related wage penalties.

6. Conclusions and implications

The findings of this study have implications for future research on disability, gender, and employment, as well as for policymakers. First, the disability-related disadvantages are evident across education and work arenas, shaping educational attainment, career trajectories and financial stability of disabled people. Since structural injustices are additive across arenas employment inequalities of disabled people are likely to exponentiate over their life course. For disabled people, education is both an individual resource *and* a driver and reinforcer of employment inequalities. Future research which engages with the unequal distribution of educational opportunities among disabled people, can contribute to expanding the understanding of the educational system's dual role in shaping labour market attainment on the individual

and group level. This has policy implications for initiatives to create more inclusive educational institutions.

Second, current findings reveal that gendered structures of the labour market are likely to cause additive strain on disabled women, but mechanisms of gendered inequalities may also contribute to explain why disabled men experience penalties in their career trajectories. Although scholars have argued that disabled workers are overrepresented in female-dominated low-paid manual or service jobs and underrepresented in petter paying male-dominated professional jobs (Wilson-Kovacs et al., 2008), systematic evidence is scarce. More quantitative longitudinal research is needed to determine whether low-skill or part-time jobs offer an entryway into the labour market for disabled people or whether these occupations predominantly serve to hamper opportunities for a stable connection to the labour market, career progression and financial security. These future studies could have important policy implications for work inclusion efforts, employer engagement and career guidance of disabled people.

Third, consequences of new technology on disabled peoples' work participation and wage setting remain unclear. The pandemic-induced shifts in work provide opportunities to study potential gains of technology for disabled workers. Further research should pay special attention to how technology may be inaccessible to various groups of disabled people and seek solutions that improve access.

Declarations of competing interest

None.

Data availability

The authors do not have permission to share data.

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Study 3

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Predicting stable employment trajectories among young people with disabilities

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Abstract

Research aiming to explain disabled people's inequalities in the labour market has primarily focused on transitional factors between school and work, wage gaps, or socioeconomic background characteristics as explanations for (no-)entry in the labour market. There is a lack of longitudinal studies that map how disabled people fare in the labour market over time. Therefore, the objective of this paper is to identify characteristics associated with stable employment paths of long-term disabled people. Our study employs detailed longitudinal data with total coverage of the Norwegian population – we focus on 11 birth cohorts (1973-83) of disabled individuals and we follow their employment trajectories between the ages 20 and 34. To describe employment trajectories and create a typology of longitudinal labour market attachments we employ sequence analysis and subsequently linear probability models to analyse the association between the disability's severity, gender, educational enrolment, and early-work experience and employment trajectories. We identify four main types of trajectories: permanently work-disabled, stable employment, early marginalization, and unstable employment. Our findings indicate that men are more likely than women to have stable employment trajectories. Starting higher education or upper-secondary vocational

education, as well as parents' higher education are statistically significant determinants of stable employment.

Keywords: social sequence analysis, disability, employment trajectories, labour market attachment, gender segmentation

Introduction

Living with a disability is associated with an increased risk of living in poverty (Batavia and Beaulaurier, 2001). Studies investigating the consequences of disability show that persons with disabilities have lower educational attainment (Esch et al., 2014), are discriminated in employment processes (Ameri et al., 2018; Bjørnshagen, 2021; Bjørnshagen and Ugreninov, 2021; Østerud, 2022), and report lower levels of social inclusion (Gannon and Nolan, 2007).

Research aiming to explain disabled people's inequalities in the labour market has focused primarily on transitional factors between school and work, and individual level background characteristics as explanations for entry (or no-entry) into the labour market or for income disadvantages (Ballo, 2020; Maroto and Pettinicchio, 2014; Pettinicchio and Maroto, 2017; Wehman et al., 2015).

Nevertheless, we note a lack of longitudinal studies of work trajectories that map how disabled people fare in the labour market over time and over the life course. This is partly because the disabled population is a heterogeneous and hard-to-reach minority and data spanning both time and variations in impairments are scarce. The lack of attention on long-term employment outcome is unfortunate because an entry into the labour market is by no means a safe ticket to long-term stability. It is vital that the consequences of early life processes and conditions are examined in a life-course perspective for people with disabilities. Gauffin et al. (2021), who study precariousness in working life, emphasize that important facets of labour market attachment will be insufficiently analysed if longitudinal aspects are disregarded. Short-term exclusion or temporary low-income is not necessarily worrying, it is the *duration* of precarious arrangements that has the most negative consequences, both for individuals and society as a whole (Gauffin et al., 2021: 382). Health-related and financial vulnerability can intensify in a downward spiral towards permanent labour market exclusion.

Work is also form of social inclusion with several positive repercussions for the individual, such as sense of mastery and meaning, in addition to financial security (Schur, 2002).

In the present study, we aim to address the lack of longitudinal research on disabled people's labour market attachment by applying a holistic perspective on working histories by means of social sequence analysis. We focus on the employment trajectories of disabled individuals and aim to describe *what characterizes stable employment trajectories among young people with disabilities*. To achieve this, we draw upon the unique strength of sequence analysis – namely "the identification of patterns of social processes over time" (Aisenbrey and Fasang, 2010: 432), combined with high-quality Norwegian longitudinal registry data spanning 24 years. By doing so, we offer some new insights on what characterizes successful employment trajectories in this group.

Our focus is on Norway, which makes an intriguing case for studying labour market trajectories for disabled young people for several reasons. First, Norway has a large social welfare state with both generous compensation for people remaining outside the labour market (Esping-Andersen, 1990), *and* comprehensive active labour market policies incentivising work participation (Dahl and Lorentzen, 2017) . Second, the educational system is free of charge, but at the same time the labour market is highly regulated and dominated by formal qualifications requirements. Which entails that it is (relatively) easy to acquire an education, but (relatively) hard to find work without formal qualifications. Finally, the Nordic labour market is highly gender segregated both horizontally and vertically, entailing deep-rooted gender-structured inequalities (Albæk et al., 2017; Reisel et al., 2019).

It remains unclear how the educational attainment and gendered structure of the labour market intersect with disability. The extant literature on labour market participation has shown that gender (Brown and Moloney, 2019; Kim et al., 2019, 2020; Pettinicchio and Maroto, 2017), and education are important determinants of labour markets participation (Ballo, 2020;

Maroto and Pettinicchio, 2014). Nevertheless, for disabled persons the impact of gender is less clear. Several studies suggest that the male privilege is less pronounced among disabled people in terms of labour market outcomes, and that disabled women therefore have similar opportunities and outcomes as men with disabilities (Ballo, 2020; Mik-Meyer, 2015). However, a recent study of early school leavers by Vogt et al (2020) claim that the gender-segregated labour market (in Norway) consistently provides men with more economically rewarding life course trajectories, than women. Further, Lorentzen and Dahl (2021) studying life-courses of social assistance recipients suggest that the child penalty (see for example Sieppi and Pehkonen, 2019) may be one explanation for women's disadvantages in longitudinal work trajectories. Given the lack of longitudinal research on disabled peoples' life courses, it is important to study the long-term consequences of gender on work trajectories.

Theory and expectations

Employment trajectories of disabled young people are likely to vary greatly depending on individual resources, severity of disability, and social and ethnic background. In the present study our main theoretical focus lies with the impact of gender and educational attainment on work trajectories.

Intersectionality and the gendered labour market: Added strain on women?

The intersectional perspective was developed to better understand the interplay between race and gender in the US context (Crenshaw, 1989). Its core implications are also relevant for understanding the interplay between gender and disability, as demonstrated by several recent studies (Ballo, 2020; Brown and Moloney, 2019; Pettinicchio and Maroto, 2017). According to the intersectional perspective the effects of gender and disability status should be understood as simultaneous and linked, rather than separate processes. In this perspective,

disabled women face a double minority status, which may further harm their inclusion in the labour market.

Nevertheless, following the insights from Ridgeway and Kricheli-Katz (2013) in developing the intersectional perspective, overlapping social identities may result in both binds and freedoms. For example, they note that the Asian man is stereotyped as a non-prototypical male person, and thus not able to reap the fruit of the typical male privilege. A similar phenomenon is discussed by Mik-Meyer (2015) who suggests that Danish disabled men are feminized by their nondisabled co-workers, as disabled characteristics such as "dependent" and "weak" are more in line with a female identity. In other words, disability status may obscure gender status jeopardizing common expectations to gender in the context of employment.

However, our expectations to intersectional processes in the work setting are also influenced by the highly gendered structures of the labour market (Charles and Grusky, 2005). Gender is one of the most important determinants of employment outcome and income levels (Blau and Kahn, 2017). The occupational gender segregation literature conceptualizes inequalities experiences by women in terms of horizontal and vertical segregation. Horizontal segregation means that women work in different occupations or different sectors than men. Vertical segregation, on the other hand, entails that women have poorer opportunities for career progression than men within occupations (Charles, 2003). Additionally, horizontal, and vertical segregation may overlap, so that typical male-dominated occupations have higher wage levels, more favourable employment arrangements, and better opportunities for progression, than typical female-dominated occupations

Despite the intersectionality perspective proposing ambivalence on the impact of gender and disability, the structures of the labour market are likely to favour men in the long run. *We therefore expect that men are more likely to have stable employment trajectories than women.*

The impact of education for disabled young people

Disabled people have on average lower educational attainment than nondisabled (Ballo, 2020) and they are underrepresented in higher education (Langørgen et al., 2020; McDonnall, 2010; Taneja-Johansson, 2021). At the same time, the extant literature provides evidence that higher education is particularly important for disabled people's labour market success (Loprest and Maag, 2007; Vedeler and Mossige, 2010). It has been shown that the lack of higher education among disabled people explains a proportion of their wage differentials (Pettinicchio and Maroto, 2017), and that disabled people often experience a delay in typical life-course transitions, such as the transition from school to work (Reims and Schels, 2021). In the following, we discuss theoretical expectations regarding the impact of ongoing education at age 20 on consecutive employment trajectory.

Studies examining the barriers students with disabilities face in higher education highlight the importance of both socio-economic factors (economic security, parental support), individual factors (such as ease of learning), and the presence of hinders within the university environment (lack of knowledge on behalf of the staff, or support infrastructure) (Fuller et al., 2004; Taneja-Johansson, 2021). Individuals in higher education at the age of 20 have most likely completed upper secondary education in standard time and may have individual resources conducive for a stable employment trajectory. For employers, educational credentials serve as an important signal of productivity. Hypotheses such as these are rooted in signalling theory, discussed in the seminal works of Spence (1973) and Stiglitz and Weiss (1990). Nevertheless, the theory of human capital postulates that education augments productivity, as individuals acquire more knowledge and skills (Becker 1962). While differentiating between these mechanisms is notoriously hard, both theoretical perspectives offer similar implications – that (more) education is linked with better employment outcomes. We can therefore expect that *disabled persons registered in higher education at the age of 20*

are more likely to have stable employment paths, compared with individuals in upper secondary education or individuals not registered in education.

As comparatively fewer disabled individuals enrol and complete higher education, it is interesting to study the impact of the upper secondary level on employment trajectories. Students at the age of 20 who are still registered in upper secondary education are experiencing a slower educational progress than those who followed the normal progression and moved on to higher education, or employment. Among the 20-year-olds who are still in upper secondary education we differentiate between academic and vocational educational tracks.

Unlike academic tracks, vocational tracks give students hands on practical work experience during the trainee phase. This gives the students both opportunities to connect with potential employers and allows the students to show future employers that they were both skilled and capable of working in their respective fields. Furthermore, upon completing many of the vocational tracks in Norway, students often receive a certificate attesting their competence and skills, which can often pave the way towards entering closed occupations (Drange and Helland, 2018). Entry in closed occupations is conditioned upon having a formal documentation of the necessary skill set, rather than on qualitative assessments of employability. Theories of occupational closure are often used to explain why wage discrimination is lower in closed occupations (Drange and Helland 2018; Weeden 2002). Alike ethnic minorities, disabled people are vulnerable to employer discrimination, thus, we argue that the ideas of occupational closure as mechanisms of labour market integration and reward are relevant for disabled people as a social minority. For instance, Drange and Helland (2018) argue that occupations requiring formal educational credentials, and specifically licensed occupations are likely to be characterized by limited wage differentiation. As vocational tracks both put students in contact with potential employers and may additionally

be a way of entering closed occupations right after completing upper secondary school: w*e expect that individuals in vocational tracks at the age of 20 are more likely to experience stable employment trajectories than individuals in academic tracks.*

The acquisition of human capital through a link between education and work is contended by Staff and Mortimer (2007). Although the debate on implications of early work experience also proposes that work may displace education (Greenberger and Steinberg, 1986; Marsh and Kleitman, 2005; Mortimer et al., 2003), Staff and Mortimer (2007) suggest that behavioural patterns established in high school persist during the transition to adulthood, and that the combination of (moderate) work and education has important advantages, weighing heavier than the risk of displacing secondary educational attainment (Staff and Mortimer, 2007: 1172). Similarly, Herrygers and Wieland (2017) have emphasized the positive formative impact of part-time work for young people. Further, early work experience may be especially advantageous for disabled young people, as demonstrated by Connors et al (2014) and Ballo et al. (in publication, Journal of Education and Work). *We, therefore, expect that individuals who combine education, whether upper-secondary or higher education, with moderate part-time work, in their early 20's, are more likely to have stable employment trajectories.*

The interplay between gender and education

The highlighted importance of the gendered structures (both vertical and horizontal segregation) of the labour market for long-term attachments and rewards, may also have implications for the choice of education. We therefore expect the interplay between gender and education to be of importance for the likelihood of experiencing stable employment trajectories. Specifically, we are interested in the differences between men and women who are not registered in education at the age of 20 (male privilege), whether there are differences between men and women in vocational tracks (horizontal segregation), and whether higher

education contributes to diminishing, as opposed to increasing gender differences (vertical segregation), in terms of likelihood for stable employment trajectories.

Data

We use administrative data from several national registries merged into one single panel dataset covering the period 1993 to 2017. Our sample consists of recipients of two types of benefits: attendance benefits and basic benefits. Both benefits are cash benefits adjusted to the severity of increased needs. Individuals who need long-term private care and supervision because of a medical condition are entitled to attendance benefits from the Norwegian Labour and Welfare Administration (NAV). Basic benefits cover necessary additional expenses incurred due to permanent illness, disabilities, or congenital malformations. Persons living with a disability may be entitled to one of these benefits or both. Our sample includes solely individuals who start to receive one of two disability benefits or both, before the age of 20 and who continue to receive these benefits for at least fifteen consecutive years during our observation period 1993-2017. Individuals who alternate between these two benefits are not excluded, but individuals with missing values on key variables are excluded from the data set. However, as registry data usually are of very high quality, any missing values are almost exclusively due to either emigration or death. The final dataset includes 3223 individual trajectories from birth cohorts 1973-1983, encompassing around 0.5 percent of the total birth cohorts which average 50-60 000 births per year.

While the sequence analyses focus on the holistic trajectories of individuals, the regression analyses employed to describe the resulting clusters adjust for a series of factors. We construct a variable that differentiates between the type(s) of benefits received (attendance benefits, basic benefits, or both). We differentiate between males and females and between persons with or without an immigration background. For immigration background, we

distinguish between: (i) majority, native born with two native-born parents (baseline); (ii) persons who immigrated from, or persons born to immigrant parents from a European Economic Area (EEA) country, Canada, North America, Australia or New Zealand; and (iii) persons who immigrated from, or are born to immigrant parents from non-EEA countries (the Balkans and Russia), Asia (including Turkey), Africa, Latin America or the remainder of Oceania. We measure ongoing education at age 20 and differentiate between individuals who are not in education (baseline), not completed upper secondary, upper secondary academic or vocational track, and higher education.

We additionally proxy the parents' socio-economic position, by accounting for the parents' highest level of education when the individual was 16, where we differentiate between those with parents having only compulsory education (baseline), completed upper secondary, completed bachelor's level education, or completed master's level education and a missing/unknown category. To account for the expansion of the education system and inter-generational changes we include dummies for birth cohorts (3 years).

Methods

To capture the holistic trajectories of disabled youth we employ sequence analysis (SA). A sequence consists of a series of states (i.e., in employment, in education, on benefits) for each individual over time (15 years). The so called "alphabet" of states is a list of mutually exclusive and exhaustive categories that make up the building blocks of the sequences (table 1). Each state is the dominant annual activity of the individual, determined by the predefined priority rule of the alphabet.

By mapping all the states for each individual SA informs of the individual's employment trajectories. The usage of SA has increased in recent years, and it has previously been employed to explain the transition from education to work (Blanchard, 2011; Lorentzen and

Dahl, 2021; Vogt et al., 2020; Wehman et al., 2015; Wel et al., 2021). The strength of this method is the added dimension it provides by considering the entire series of states (i.e. trajectories) and its patterns: timing, ordering and duration of states (Stovel and Bolan 2004; Aisenbrey and Fasang 2010). This is an advantage to other longitudinal methods such as event history analysis, which are mainly focused on counting down towards a specific event, without fully accounting for the heterogenous nature of the trajectories leading up to the event studied (Studer and Ritschard 2016).

In the following sections, we present the states employed in the analyses, the measures of dissimilarity employed, and the partitioning method used to create the clusters. After creating the clusters, we estimate a series of linear probability models to assess what characteristics are linked with cluster membership. Our results are presented as coefficients with their 95 percent confidence intervals. Additional analyses, where multinomial logistic models were used to explore cluster membership revealed substantially equivalent results.

Alphabet

The alphabet of states is a list of mutually exclusive and exhaustive categories that make up the building blocks of the sequences. We construct annual states building on the status alphabet constructed by van der Wel et al. (2021), although with some adjustments. We define seven states (Table 1) in the following order of priority: Work-disabled, normal income, education with part-time work, education without part-time work, low income, social welfare, and marginalization (rest category).

To adjust for relative and real changes in prices and wages during the 24-year observation period, income cut-offs are measured in price base amounts (PBA) which is a fixed annual amount used to calculate applicability and level of welfare benefits, pensions, and student

allowances in Norway. The amount is adjusted annually to reflect expected wage growth and adjusted for discrepancies between expected and actual growth during the last year.

We parallel former Nordic studies of labour market attachments (Bäckman and Nilsson, 2011; Elstad and Heggebø, 2019; Gauffin et al., 2021; Widding-Havnerås, 2016) and use 3.5 PBA as a threshold for normal income, and perform sensitivity analyses at 3 and 4 PBA (supplementary material). According to Gauffin, Heggebø and Elstad (2021: 386), 3.5 PBA approximates the annual pay of a full-time worker in the lowest income brackets, equivalent to thirds of the median work income. Parental benefits and compensation for sick-leave are included in the income measure, as these benefits usually imply a full wage compensation and seldom signify a termination of the preceding employment arrangement. We set the threshold for economic marginalization to 0.5 PBA, in correspondence with former studies such as Bäckman and Nilsson (2016).

[Table 1]

Dissimilarity algorithm and partitioning

In sequence analyses the similarity of the trajectories can be calculated by the number of operations required to transform one sequence into another (Aisenbrey and Fasang, 2010). As our main interest is to identify stable labour market attachments, we are more concerned with order and duration of states, than the exact timing of states. Therefore, we employ data-driven substitution costs calculated with the aid of the *longest common subsequence* (LCS) algorithm (Studer and Ritschard, 2016). By pairing together sequences based on the length of common subsequences we are for example able to group sequences of education followed by normal income and distinguish these from sequences of alternating social welfare and low income.

However, Studer and Ritschard (2016) recommend to let both theoretical knowledge and empirical evidence weigh in on the choice of dissimilarity matrix. Therefore, we did evaluate

partitioning quality measures for a range of different dissimilarity algorithms. We note that *reversed longest common prefix* (RLCP) gave very similar clusters and very similar quality scores (see supplementary material). RLCP and LCS are similar algorithms, however, RLCP looks for the common elements at the end of the sequence, while LCS is concerned with the overall length of common subsequences (Gabadinho et al., 2011: 25). Given our theoretical interest in *long-term* labour market attachment, we moved forward with the analysis using LCS.

The aim of the partitioning (or clustering) is to create groups of sequences that are as homogeneous as possible and as different from another as possible (Studer, 2013). We use the partitioning method recommended by Studer (2013): Ward hierarchical clustering in combination with the Partitioning Around Medoids (PAM) algorithm to group similar sequences. We arrive at a four-cluster solution after evaluating various number of clusters visually and evaluating their partitioning quality scores. A more detailed explanation of the relevant quality scores is available in the methodological addendum.

Results

Descriptive overview over sequences

Figure 1 displays three descriptive graphs of the sequences. The most common trajectory representing about a quarter of the total number of sequences are trajectories of permanent work-disability (yellow). Education with part-time work (blue) is often followed by periods of normal income (orange), and education without part-time work (pink) appears to precede mixed trajectories of which many develop into permanent work-disability. The state distribution plot displays the distribution of statuses at each given time point, disregarding the individual ordering of states. According to this plot, permanent work-disability and normal income are the two most common states in the last third of the 15-year sequences. A small

part of the individuals is in low income (green) and an even smaller part on social welfare (brown) at timepoint 15.

[Figure 1]

Clusters of labour market trajectories

We named the clusters by visually evaluating the silhouette sorting of the sequences in each cluster as displayed in figure 2. Silhouette sorting implies that the top sequence of each cluster is the most typical sequence and the most distinct from other clusters. The bottom sequence is the least typical and with the smallest distance to one or several other clusters. The first cluster is the "permanently work-disabled" (cluster 1, N=1176) encompassing those people that have been granted a permanent work incapacity benefit at a young age. The second type is the "stable employment" cluster (cluster 2, N= 1080). Here we find those individuals that have a period of education, either with or without part-time work followed by long periods of normal income. The third cluster is the smallest cluster and can be described as "early marginalization" (cluster 3, N=457) from education, work, and social welfare, mixed with unstable periods of social welfare and a high degree of permanently work-disability towards the end of the observation period. We named the fourth cluster "unstable employment" (cluster 4, N=510) because it shows frequent changes in states shifting back and forth between low income, social welfare, and education without work.

[Figure 2]

Descriptive individual level background characteristics of the four clusters are displayed in Table 2. All variables are measured at timepoint 1 (20 years of age). We first note the variation in benefit type between the clusters. Over 80 percent of individuals in "stable employment" or "unstable employment" are recipients of basic benefits only. This indicates that the two employment clusters consist of individuals with less severe diseases and with

disabilities not in need of personal care and attendance. The share of attendance benefits and recipients of both benefits simultaneously is higher among individuals in the clusters "permanent work-disability" and "early marginalization" Men and women are equally represented in "stable employment", but women are overrepresented in "unstable employment", with a share of 64 percent. The variation in education across clusters shows that most individuals are either not in education the year they turn 20, or still in the first two years of upper secondary education. Individuals in the "stable employment" cluster, stand out with a share of 38 percent in higher education. This reflects a capacity among individuals in this cluster to have a normal school progression followed by a swift transition to higher education at the age of 19 or 20. The "unstable employment" cluster has the largest proportion of individuals not in education (61 percent). The variable measuring parents' educational level shows that individuals in "stable employment" have parents with higher levels of education than individuals belonging to other clusters.

[Table 2]

Predicting cluster-membership

To examine how individual background characteristics are related to cluster type we estimate linear probability models predicting individual cluster memberships (Figure 2). The first model estimates the probability of belonging to one of the two employment clusters, that is stable and unstable employment (value 1) versus permanent work-disability and early marginalisation (value 0). Results show that health, proxied by benefit type, is the most influential determinant for belonging to either stable or unstable employment. Second, ongoing education at the start of the observation period is an important predictor, but parents' educational level is also found statistically significant. Individuals who are about to finalize upper vocational track secondary education or have started higher education are more likely to belong to either stable or unstable employment clusters, than individuals who are either not in

education, still in their first two years of upper secondary or in final year academic track upper secondary. Individuals whose parents have completed upper secondary education or have higher education are more likely to belong to the stable or unstable employment clusters.

Immigration background is not associated to employment trajectory cluster. However, people with immigration background are likely to be underrepresented in our data because of the data selection procedure (pre-age-20 disability and 15 years observed disability). Younger cohorts seem to be less likely to belong to the work trajectory type, indicating a slow trend towards a less inclusive labour market.

[Figure 3]

The second model excludes all individuals in the permanently work-disabled cluster and the early marginalization cluster, hence estimating the probability of being in stable employment as opposed to unstable employment. Results show that women are less likely to have stable employment trajectories. Ongoing education at age 20 is influential for the probability of being in stable employment, however being enrolled in an academic upper secondary track is not statistically significantly different from not being in education or being in the first two years of upper secondary. The vocational track, however, is related to higher probabilities of stable employment. The same is true for individuals enrolled in higher education. Individuals who are enrolled in higher education have completed upper secondary education, which means that the estimate for those enrolled in academic track upper secondary reflects those who did not complete within standard time. Parents' education appears to be positively related to probabilities of stable employment.

We find no relationship between immigration background and stable employment, which may be a result of having excluded everyone migrating to Norway after the age of 20. Birth cohort

is not found to predict probability of stable employment, which indicates that results are stable over time.

[Figure 4]

To further explore the relationship between gender, education, and stable employment we estimate model 2 again adding an interaction between gender and education. Predicted probabilities of men and women over education, with control variables at means, are plotted in Figure 3. Lines represent point estimates with surrounding 95 percent confidence intervals. The figure shows that men who are not in education in the initial year of the study period have higher probabilities of stable employment than women who are not in education. Men who are enrolled in vocational track upper secondary also have significantly higher probabilities of stable employment than women who are in vocational education. Among people who are in their first two years of upper secondary, academic upper secondary or higher education, there are no gender differences in probability of stable employment. The full model is available in the supplementary material.

Concluding discussion

This paper was motivated by the lack of empirical research on disabled peoples' labour market trajectories. The objective of the present study was to identify stable employment trajectories of disabled people and determine how gender and education relate to probability of stable employment trajectories. We used administrative register data of 3223 disabled people between the ages 20 and 34 from birth cohorts 1973 to 1983. Social sequence analysis, including cluster analysis of sequences, was used to arrive at typical employment trajectory clusters. Our analyses show that women are at higher risk of unstable trajectories, that both education and early work experience are linked with employment stability.

Gender

Our findings indicate that women are less likely to experience stable employment trajectories, which confirms our theoretical expectations related to how intersectional processes and the gender segregated labour market impact disabled women.

The finding also echoes extant results related to gender from quantitative studies of disabled people's work outcome: For instance, in a population survey study from 2017, Pettinicchio and Maroto, using an intersectional approach to explaining income gaps by gender and disability type, find multiplicative effects of gender and disability, creating a hierarchy of work outcomes. Similarly, Brown and Moloney (2019), in a longitudinal study of community survey data, find that disabled women earn less and are less likely to experience autonomous working conditions, than their male counterparts and nondisabled workers. Intersectional discrimination against disabled women is also found by Kim, Parish and Skinner (2019), who use the UK Life Opportunities Survey to study the economic well-being of disabled people between 2009-2014.

Education and early work experience

We found no statistically significant difference between not being in education at age 20, first year upper secondary and academic track upper secondary education for the probability of stable employment. However, being enrolled in higher education is related to a higher probability of stable employment trajectory, compared with not being in education at age 20. Thus, our expectations regarding higher education as conducive to stable employment were confirmed. The finding may reflect that education has both a positive signalling effect towards employers (Spence, 1973; Stiglitz and Weiss, 1990), serves as accumulation of human capital which may augment productivity (Becker, 1976), but the results likely also reflect a certain selection mechanism through socioeconomic and individual factors.

The second finding regarding education was that vocational track upper secondary education is related to higher likelihood of stable employment, compared to not being in education at age 20 and to being in academic track. This finding confirmed our theoretical expectation related to occupational closure (Drange and Helland, 2018). Regulated occupations that rely on formal qualifications in recruitment processes have less room for discriminatory practices concerning marginalized groups. The finding could additionally be linked to skill specificity – that starting vocational education gives a clearer match to jobs – especially compared to the academic track. The positive relationship between vocational track and likelihood of stable employment also gives support to our hypothesis regarding early work experience as positive for employment trajectories. We find, in correspondence with Staff and Mortimer (2007) and Herrygers and Wieland (2017) that early work experience understood as part-time work in combination with education is advantageous for stable employment. Our findings support earlier research by Connors et al (2014) and Ballo et al. (forthcoming) in that early work experience is especially important for disabled young people. In the present study we do not compare trajectories of disabled to those of non-disabled, but states of education with part-time work are almost exclusively located in the stable employment trajectory cluster, which indicates that it in most cases leads to stable employment for young disabled people.

The interplay between gender and education

The present findings regarding gender and education gave reason to explore the interplay between gender and education. Analyses revealed statistically significant gender differences at age 20 in two areas: 1) men not enrolled in education were more likely to experience stable employment paths than women not enrolled in education; and 2) men in vocational track upper secondary were more likely to experience stable employment than women in vocational track upper secondary. These results echo findings by Lorentzen and Vogt (2022) which

suggest that women skilled in female-dominated trades have less favourable employment trajectories compared with men skilled in male-dominated trades.

The interaction model found no gender differences among individuals in higher education at age 20. Thus, higher education is especially important for disabled women, compared with disabled men. A finding corresponding to earlier research on disabled men and women in Norway (Ballo, 2020), which found higher education to be more beneficial for disabled women's labour market participation, than disabled men's. These findings confirm the gender inequality producing structures of the labour market discussed earlier.

Limitations and suggestions for further research

Our study has some limitations. First, as our focus lies in better understanding the heterogeneity within the disabled population, we do not compare trajectories of disabled people to those of nondisabled people. Second, as we evaluate the importance of several factors at the early age of 20, we do not account for personal and family-related aspects which develop over the life-course and may impact labour market attachment (such as intendent leaving, marriage, having children). Third, we define disability as persons with benefits before the age of 20, which excludes those who may have congenital diseases, but with a late diagnostic process.

These factors should be subject to further scrutiny. To exemplify, it is possible that the child penalty is one important explanatory factor, as suggested by Lorentzen and Dahl (2021). However, although well-documented on the population level across countries, the consequences for disabled women of bearing children have not yet been examined. Our findings emphasize the need for future research to determine the implications of having children for disabled women (and men) and their successive careers.

Despite these limitations, our findings related to gender make an important contribution to the intersectionality perspective in disability studies, by confirming the multiplicative effects of the disability and female status with quantitative population data. We argue that the mechanism proposed by Ridgeway and Kricheli-Katz (2013) that one social identity may obscure the other when they intersect, may very well be true in *individual* situations, but the current study clearly shows that being female and disabled remains a disadvantaged position on the societal level and over the life-course.

We conclude by stressing two main practical implications of our findings: 1) facilitation of education for disabled youth should be strengthened, and especially so for disabled women; and 2) alternative paths to employment for individuals who are unable to complete education should be considered by policymakers, social workers, and employers.

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Tables and figures

Table 1: Status alphabet

States	Operationalisation	Priority
Work-disabled	Recipients of more than 50% work-disability benefit	Above everything below
Normal income	Income above 3.5 PBA, parental leave benefits and compensation for sick leave included	Above everything below
Education with part-time work	Registered in education, with income between 0.5-3.5 PBA	Above everything below
Education without part-time work	Registered in education, income below 0.5 PBA	Above everything below
Low income	Income above 0.5 PBA but below 3.5 PBA, parental benefits and compensation for sick leave included	Above everything below
Social welfare	Social assistance, work assessment allowance, unemployment benefits	Above everything below
Marginalized	Income below 0.5 PBA and not belonging to any of the above states	Rest category

Table 2 Descriptive statistics of clusters

	Cluster 1 Permanently work-disabled	Cluster 2 Stable employment	Cluster 3 Early marginalization	Cluster 4 Unstable employment
N	1176	1080	457	510
%	36 %	34 %	14 %	16 %
Male	54 %	50 %	48 %	36 %
Female	46 %	50 %	52 %	64 %

Ongoing education				
Not in education	45 %	38 %	39 %	61 %
Not completed upper sec	50 %	8 %	40 %	15 %
Upper sec., academic track	3 %	5 %	8 %	8 %
Upper sec., vocational track	2 %	10 %	6 %	6 %
Higher education	1 %	39 %	6 %	9 %
Parents' educational level at age 16				
Mandatory only	20 %	10 %	18 %	16 %
Upper sec.	54 %	53 %	51 %	60 %
BA	19 %	26 %	22 %	16 %
MA	7 %	11 %	6 %	7 %
Missing	1 %	0 %	3 %	1 %
Immigration background				
Immigration background: Norway	94 %	96 %	91 %	94 %
Immigration background: EU/USA	1 %	1 %	2 %	1 %
Immigration background: Asia/Africa ++	5 %	3 %	7 %	5 %
Benefit type				
Basic benefit	25 %	85 %	35 %	81 %
Attendance benefit	37 %	6 %	31 %	5 %
Both basic and attendance	38 %	10 %	34 %	15 %
Birth cohort				
1973/1974	11 %	17 %	19 %	17 %
1975/1977	25 %	26 %	21 %	29 %
1978/1980	28 %	27 %	27 %	24 %
1981/1983	36 %	30 %	33 %	30 %
	100 %	100 %	100 %	100 %

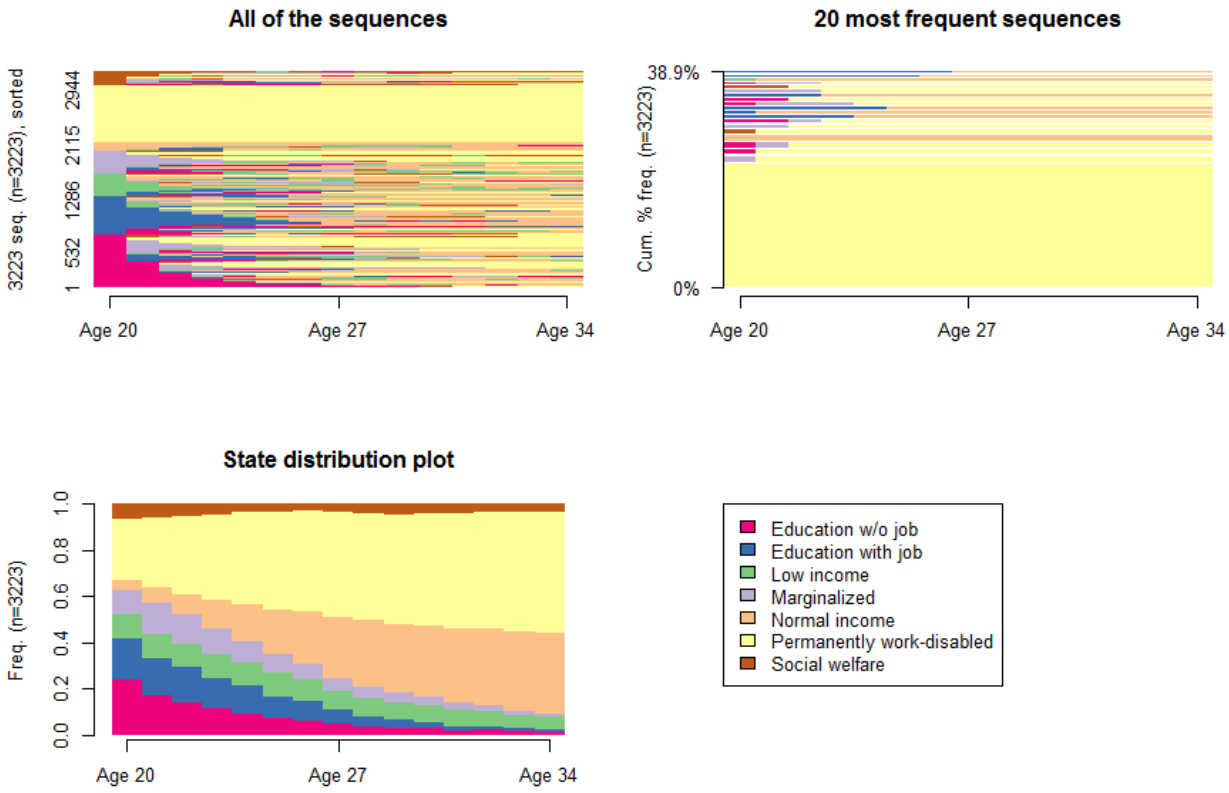

Figure 1Typical sequences

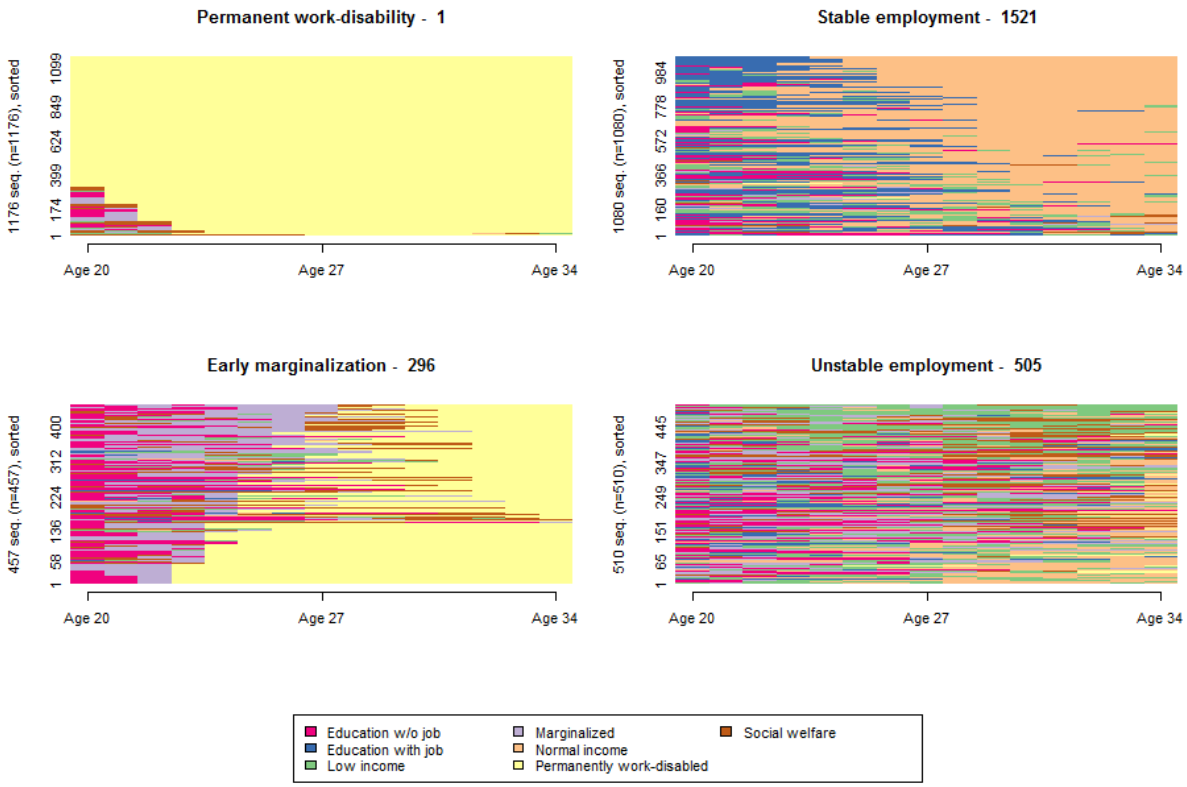

Figure 2 Four cluster solution with silhouette sorting using the LCS algorithm

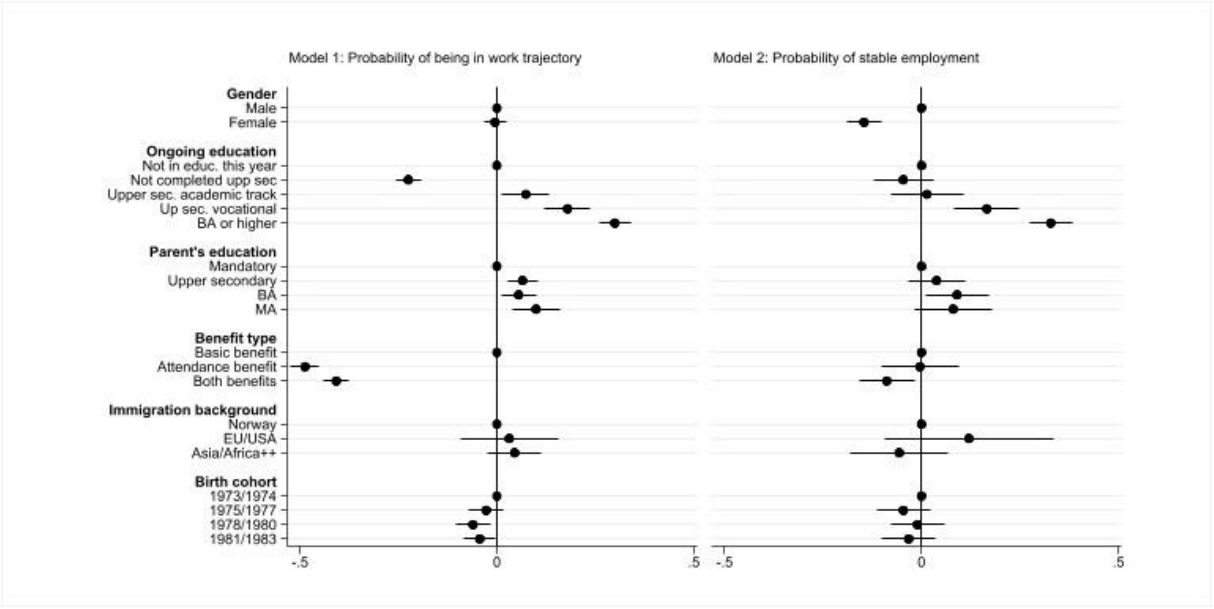

Figure 3Linear probability models, coefficients with 95 percent confidence intervals

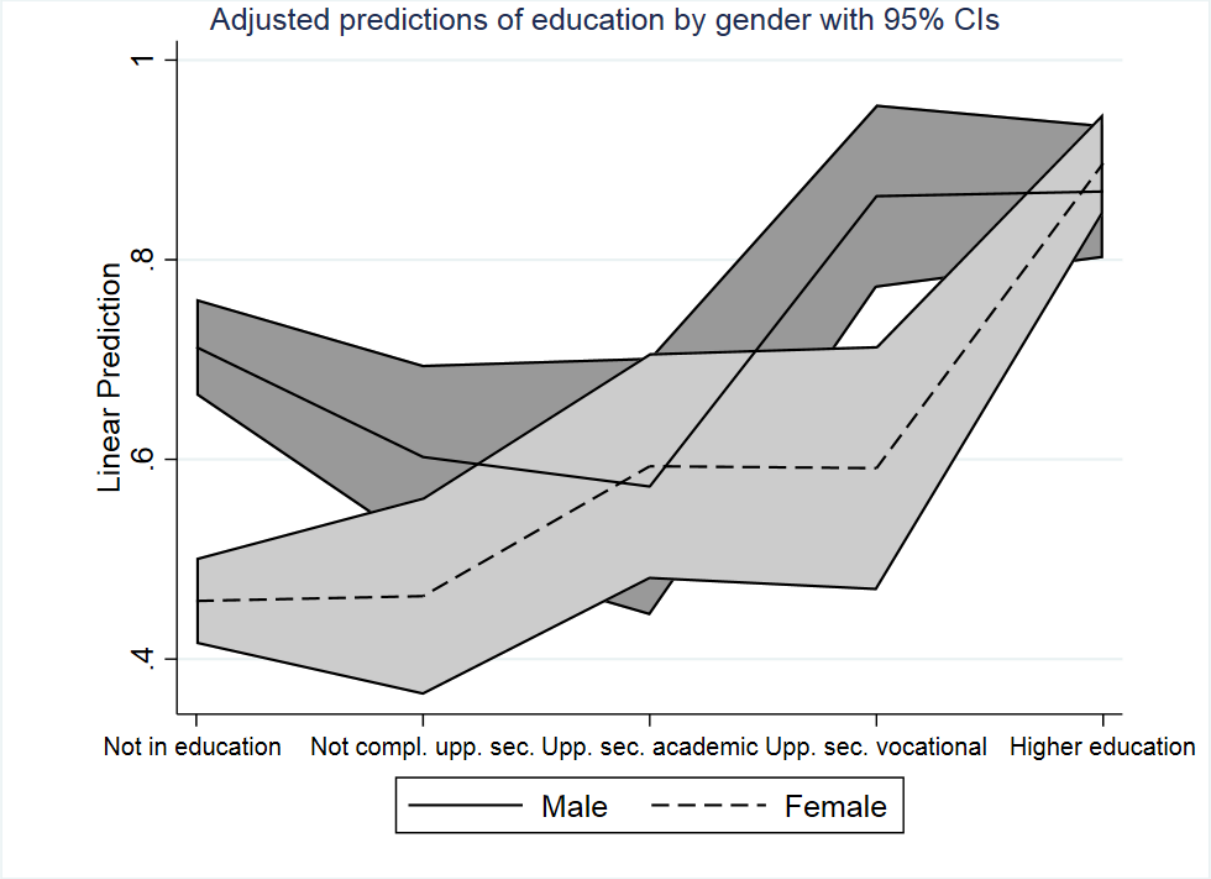

Figure 4Predicted probabilities of stable employment for men and women by education

Supplementary material

Methodological addendum

Figure A1 displays the values of the four most interesting quality measures for N number of clusters. The Average silhouette width (ASW) (Kaufman and Rousseeuw 1990) is the most important measure: “It is based on the coherence of the assignment of an observation to a given group, comparing the average weighted distance of an observation from the other members of its group and its average weighted distance from the closest group” (Studer, 2013: 14). The ASW value should be above 0.5 to claim a reasonable structure (Kaufman and Rousseeuw 1990). The indicators “point biceral correlation” (PBC) and “Hubert’s Gamma” (HG) “measure the capacity of a partition of the data to reproduce the distance matrix” (Studer, 2013: 33). A partition should aim to maximise both PBC and HG. Finally, the “Hubert’s C” (HC) measure “compares the partition obtained with the best partition that could have been obtained with this number of groups and this distance matrix. In contrast to the other indexes, a small value indicates a good partition of the data” (Studer, 2013: 33). According to Figure A1, a three-cluster solution would be optimal. However, the four-cluster solution is better suited to answer our research question, as it separates the unstable from the stable employment trajectories and is therefore preferred.

Figure A2 shows the quality measure values of N number of clusters for the RLCP algorithm, and figure A3 shows a four-cluster partitioning using RLCP. It is visually evident that the RLCP clustering emphasizes the latter part and final state when comparing sequences, rather than the duration in each state. Thus, RLCP, despite its similarities to LCS, is a less useful choice when determining characteristics of stable work trajectories.

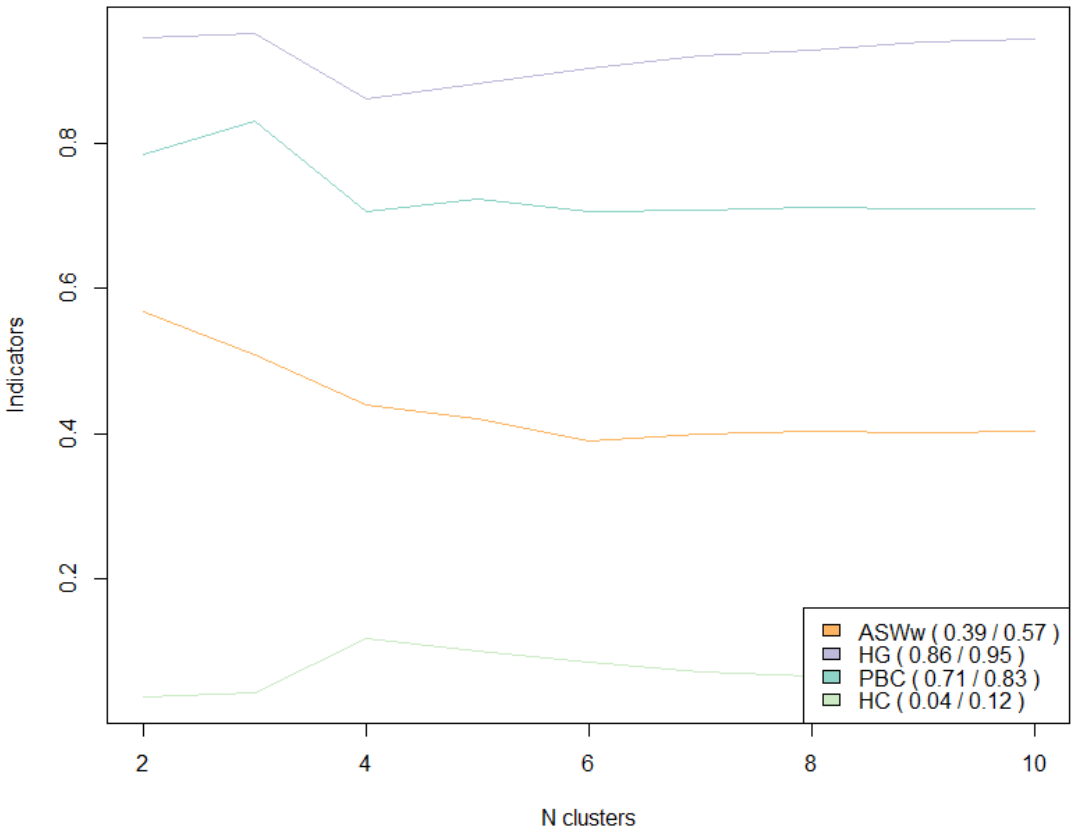

Figure A1 Partition quality scores for N number of clusters using LCS

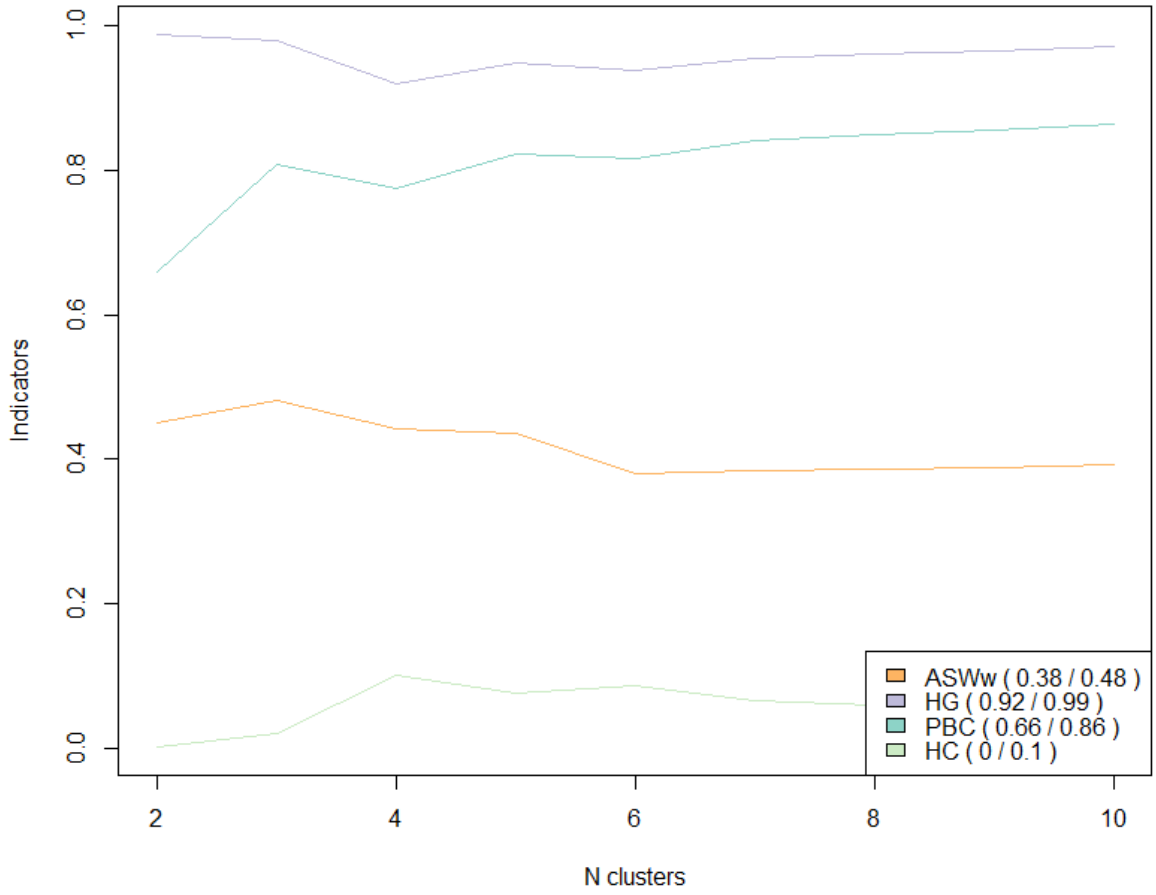

Figure A2 Partition quality scores for N number of clusters using RLCP

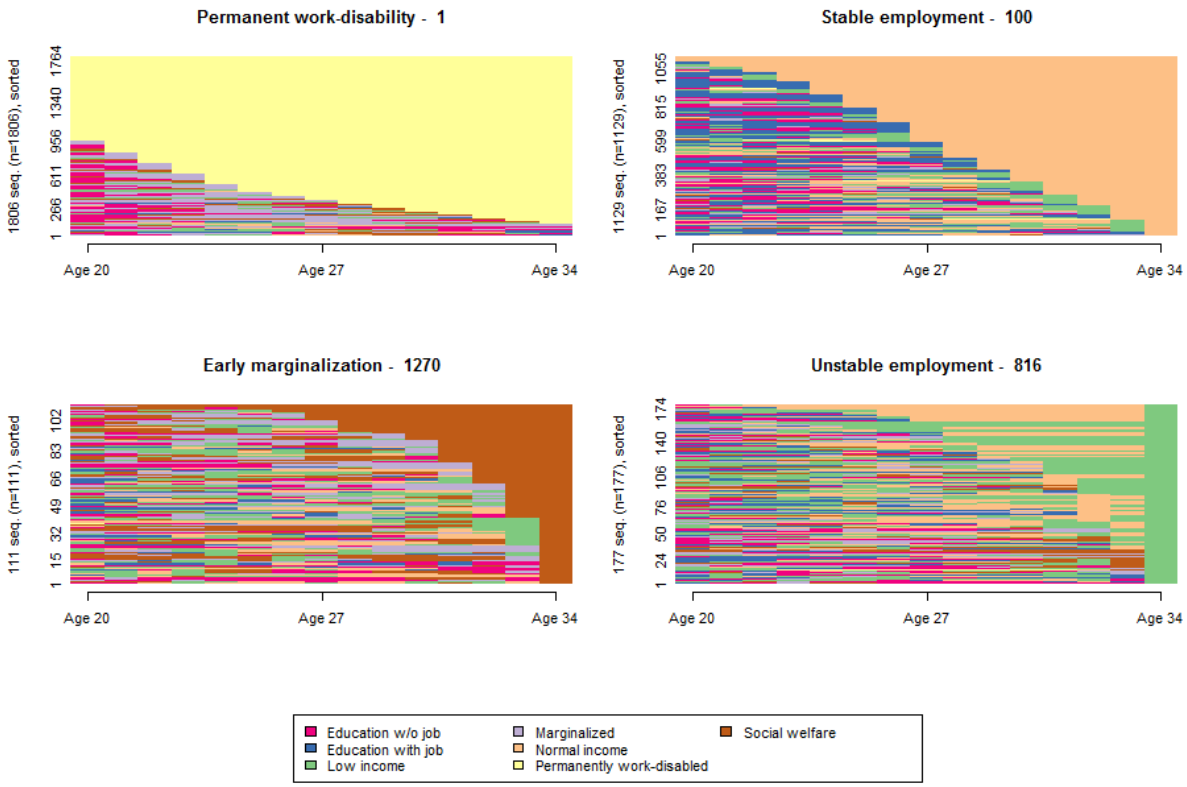

Figure A3 Four cluster solution with silhouette sorting using the RLCP algorithm

Additional tests for the dissimilarity matrices *longest common prefix* (LCP) and *number of matching subsequences* (NMS) revealed similar partitioning quality scores. However, these algorithms produced clusters with low substantial value for our research question. These results are available upon request.

Sensitivity analysis of income cut-off

The partition of the sequences into clusters may be sensitive to the chosen cut-off for "normal income". We test the sensitivity of the clustering by first decreasing the cut-off for normal income to 3 PBA (figure A4) and then increasing it to 4 PBA (figure A5). Decreasing to 3 PBA primarily impacts the stable and unstable employment clusters, turning many of the unstable trajectories into sequences of long-term "normal income". However, an annual income of 3 PBA is likely to come from part-time work, and hardly enough to sustain a living or a family. Lifting the normal income cut-off to 4 PBA turns some of the stable trajectories into more unstable trajectories, with more frequent shifts between low and normal income. The unstable trajectory cluster does not change significantly by lifting the cut-off, but a proportion of the unstable sequences that were characterized by frequent shifts turn into sequences of persistent low-income. Overall, the patterns and findings of the paper's main analyses appear robust.

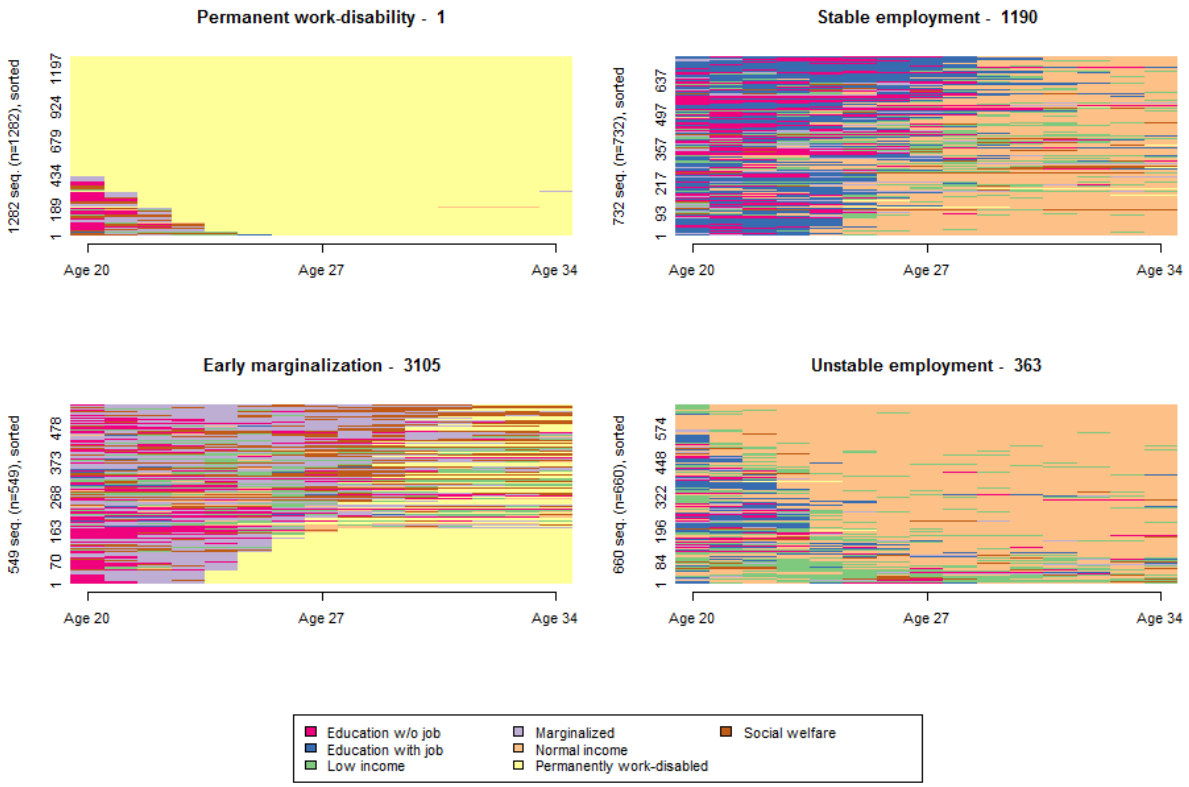

Figure A4 Sensitivity analysis: Cut-off for normal income at 3 PBA, LCS algorithm

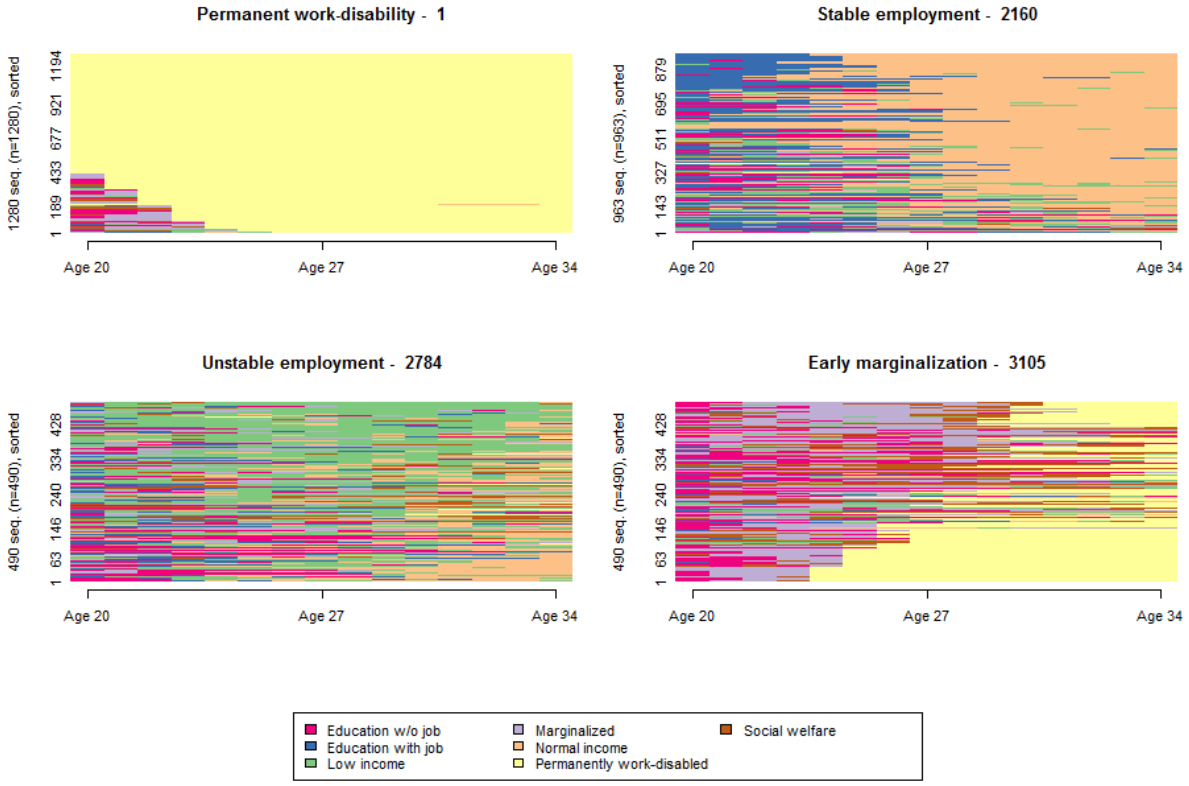

Figure A5 Sensitivity analysis: cut-off for normal income at 4 PBA, LCS algorithm

Table A1 Regression model predicting probabilities of stable employment, with the interaction of gender and education

VARIABLES	COEF	SE
Female (ref: male)	-0.254**	(0.033)
Ongoing education (ref: not in education)		
Not completed upper sec	-0.110*	(0.053)
Upper sec., academic track	-0.140*	(0.070)
Upper sec., vocational track	0.151**	(0.053)
Higher education	0.156**	(0.042)
Interaction gender X education		
Female X First year upper sec	0.115	(0.076)
Female X Upper sec., academic track	0.275**	(0.093)
Female X Upper sec., vocational track	-0.018	(0.084)
Female X Higher education	0.283**	(0.053)
Parents' education (ref: mandatory)		
Upper secondary	0.042	(0.036)
BA	0.100*	(0.041)
MA	0.081	(0.049)
Benefit type: Basic benefit		
Attendance benefit	0.001	(0.050)
Both benefits	-0.094**	(0.035)
Immigration background (ref: Norway)		
EU/USA	0.093	(0.109)
Asia/Africa++	-0.061	(0.063)
Birth cohort (ref: 1973/1974)		
1975/1977	-0.048	(0.034)
1978/1980	-0.020	(0.035)
1981/1983	-0.045	(0.034)
Observations	1 557	
R-squared	0.160	

Standard errors in parentheses

** p<0.01, * p<0.05

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