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Original Article

Transformed 'postmodern' life courses? Continuity and change in young adults' labour market trajectories in Norway

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Accounts of contemporary youth often take increased variability in the young adult life course for granted. However, we lack studies examining variability in the labour market domain during the rapid globalization of the three most recent decades. Employing the theoretical concepts of differentiation and de-standardization, cross-cohort change is evaluated for young adults in Norway, separately by gender and social origin. Using high-quality registry data (N = 1,081,702), 20 complete birth cohorts are followed from age 22 to 31, spanning the years 1993–2017. Adding to the theoretical discussion of life-course change, variability is evaluated alongside changes in the specific valued content of trajectories—denoted as the quality of labour market attachment. Results show modestly declining trajectory variability. Simultaneously, the quality of male and female labour market attachment changes in opposing normative directions. Female trajectories remain more complex and insecure than men's but show improvements across the 1990s. Among men, especially those of low social origin, labour market trajectories become more precarious. Results challenge the common notion that young adults generally go through increasingly insecure school-to-work trajectories. Instead, findings indicate that social origin interacts with historical time in differing ways among men and women, producing intersectional patterns of continuity and change.

Introduction

The assertion that life courses are becoming increasingly 'chaotic', 'volatile', or 'variable' is a frequent point of departure in studies of young adults (Shanahan, 2000; Furlong, 2017; Middeldorp *et al*., 2018). Influential scholars assume that economic globalization and technological change destabilize labour market attachment patterns, especially for young adults, who have been denoted 'the losers of globalization' (Mills *et al*., 2005; Buchholz *et al*., 2009; Standing, 2011). Globalization has accelerated since the early 1990s (Gygli *et al*., 2019), and the question of whether young adults' labour market attachment is becoming increasingly precarious has become a prominent topic in both public and academic debate.

In life-course research, growth in life-course variability is conceptualized as processes of *differentiation* and *de-standardization* (Brückner and Mayer, 2005), referring to rising variation *within* and *between* trajectories, respectively (Aisenbrey and Fasang, 2010). While previous studies primarily concentrate on one or the other, this study maps both processes within the same study population, contending that they denote different dimensions of change. Adding to previous work addressing the operationalization of these terms (Elzinga and Liefbroer, 2007; Aisenbrey and Fasang, 2010; Elzinga, 2010), the distinction between objective and normative sequence volatility (Brzinsky-Fay, 2007; Ritschard, 2021) is applied to link objective differentiation and de-standardization dynamics to changes in the specific valued content of labour market attachment trajectories—denoted in the following as changes in sequence quality.

Previous studies of variability in labour market trajectories suggest more stability in past decades than is commonly assumed (Brückner and Mayer, 2005; Biemann *et al*., 2011; Van Winkle and Fasang, 2017, 2021). However, debates surrounding the extent, direction, and normative implications of trajectory changes are not settled. *First*, previous research has primarily followed cohorts born up until the beginning of the 1970s (Berger *et al*., 1993; Brückner and Mayer, 2005;

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Elzinga and Liefbroer, 2007; Widmer and Ritschard, 2009; Biemann *et al*., 2011; Nico, 2014; Hart and Lyngstad, 2016; Lesnard *et al*., 2016; Van Winkle and Fasang, 2017, 2021; Van Winkle, 2018; Zimmermann and Konietzka, 2018; Ramos, 2019). Therefore, we know surprisingly little about cohorts entering young adulthood during the increasing globalization and labour market automatization of the 1990s and 21st century.

Second, while rising trajectory variation is frequently tied to precarity and rising insecurity, previous literature mainly employs unvalued measures of sequence variation (Biemann *et al*., 2011; Van Winkle and Fasang, 2017, 2021; Zimmermann and Konietzka, 2018; Ramos, 2019). We need studies that comprehensively consider the normative implications of differentiation and de-standardization dynamics.

Third, few contributions consider intersectional differences by gender and social origin, even though scholars assume that globalization amplifies existing inequalities and that both gender and initial distribution of resources explains large parts of the variance in life-course outcomes (Mayer, 2004; Mills and Blossfeld, 2005; Mills *et al*., 2008; Standing, 2011). Zimmermann and Konietzka (2018) suggest that those with short education drive de-standardization of family life courses and call for studies of social disparities in the work domain.

This article addresses these knowledge gaps through the following two study aims; First, to evaluate the general claim, and normative direction, of differentiation and de-standardization processes across cohorts who experienced young adulthood during the increasing globalization and labour market restructuring of the 1990s and 21st century. Second, to consider how trajectory patterns in the labour market domain vary between men and women of different social origins, measured as parental level of education.

Applying registry micro-data from Norway allows for full-population analysis within an interesting institutional context. The Norwegian labour market has undergone significant transformations during the study period (Ellingsæter *et al*., 2020). At the same time, key institutional aspects of welfare benefit schemes—entitlements, criteria for determining benefit levels, and duration of access—have remained fairly stable (Øverbye and Stjernø, 2012; Dahl and Lorentzen, 2017). Norway thus provides a context where changes observed through registry data are not likely to result from the social benefits system itself.

The analysis is performed by applying measures of objective sequence variation and valued sequence quality to data covering 20 cohorts (born 1971–1990) across 10 years of young adulthood (age 22–31), spanning the historical period 1993–2017. Labour market attachment is measured as yearly positions employing the categories: *core labour*, *in education*, *marginal labour*, *health-related absence*, *unemployment*, *economic marginalization*, and *disability*.

Theoretical background and previous research

Conceptualizing variability in labour market attachment trajectories

The concepts of differentiation and de-standardization draw attention to different dimensions of change, which may occur simultaneously, but also independently, from each other (Brückner and Mayer, 2005). *Differentiation*, understood as increases in *within*-trajectory variation (Aisenbrey and Fasang, 2010), refers to a process where life courses become more internally complex. On an aggregate level, differentiation is therefore often understood as a change in central tendency and measured as changes at the *mean*. *De-standardization*, on the other hand, understood as increasing *between*-trajectory variation (Aisenbrey and Fasang, 2010), suggests changes in the *shape* and *spread* of a distribution. Contending that distributions with very different dispersion can have the same mean, this article considers both processes to better understand the nature of life-course changes.

In the globalization literature, differentiation and de-standardization are frequently linked to theories of increasing labour market risks (Buchholz *et al*., 2009; Biemann *et al*., 2011; Van Winkle and Fasang, 2017, 2021; Zimmermann and Konietzka, 2018), where differentiation is tied to job losses, precarity and instability, and de-standardization implies that stable work trajectories disintegrate and become less universal across the population. However, the initial definitions of these concepts developed by Brückner and Mayer (2005) entail more value-neutral descriptions that do not necessarily imply a qualitative deterioration. While rising trajectory variability can be caused by more frequent spells of unemployment and marginal labour, it can also result from a rise in education or upward labour market mobility (or both).

The present study borrows the distinction between *objective* and *normative* sequence volatility (Brzinsky-Fay, 2007; Ritschard, 2021) to evaluate objective changes (differentiation and de-standardization) alongside normative changes in sequence quality, denoted in the following as *Precarization* and *Disintegration*. A composite measure of sequence quality and sequence visualizations supplements established measures of objective variation. Table 1 summarizes the dimensions of trajectory change studied and related measures.

Table 1: Conceptualization of trajectory change: Dimensions, concepts, and measures.

Dimension	Within trajectory variation		Between trajectory variation	
Type variation	Objective	Normative	Objective	Normative
Concept	Differentiation	Precarization	De-standardization	Disintegration
Definition	Process where the number of distinct states or stages in trajectories increases*	Process where the quality of trajectories decreases	Process where distinct states and the sequences in which they occur become less universal for given population groups*	Process where "good" states and the sequences in which they occur become less universal for given population groups
Measures	Complexity index (Mean values) (Gabadinho et al. 2011)	Badness index (Mean values) (Ritschard, 2021)	Transversal entropy (Shannon,1948) Distribution of Complexity	State distribution plots Distribution of Badness

*Definitions slightly adapted from Brückner and Mayer (2005, pp. 32-33).

Trajectory variability across birth cohorts

Influential scholars theorize how modernization and globalization change the structure of the life course (Mayer, 2001, 2004; Blossfeld *et al.*, 2005; Brückner and Mayer, 2005; Kohli, 2007; Möhring, 2016). While the 1960s and early 1970s is denoted as a period of life-course 'institutionalization' (Kohli, 2007), less standardized or more 'individualized' patterns are described since the 1980s (Beck, 1992; Inglehart, 1997; Beck-Gernsheim, 2002). Across the 1990s, accelerating globalization is expected to fast-track processes of social change and increase general uncertainty (Buchholz *et al.*, 2009).

Several mechanisms which can produce differentiation and de-standardization of labour market attachment are discussed within this literature. *First*, internationalization of markets and intensified global competition is expected to increase employers demands for flexibilization and deregulation, increasing uncertainty in individuals' employment relationships (Mills and Blossfeld, 2005). Young adults are expected to be particularly exposed because they lack job experience, networks, and negotiation powers compared to older adults (Blossfeld *et al.*, 2005; Buchholz *et al.*, 2009). If former stable employment patterns are increasingly replaced by short-term, part-time, precarious jobs, and unemployment spells, both within- and between-trajectory variations will objectively rise while the normative quality of trajectories decline.

Second, rapid technological change is expected to reduce employment stability overall, by shifting employers' strategies towards short-term profit and reducing their incentives to engage in long-term employment relationships (Berg and Kalleberg, 2001). Technological development and automatization are also expected to reduce low-skilled labour demand (Mills and Blossfeld, 2005). Increasing difficulty of finding work among the low-skilled is often expected to increase complexity and de-standardization (Van Winkle and Fasang, 2017). However, if the low-skilled are increasingly excluded from the labour market, objective complexity and de-standardization may also decline in this group as trajectory quality declines. The most economically precarious working lives will then be characterized by complete stability out of the labour force, with zero trajectory variation and low trajectory quality.

Third, increasing variation may also be linked to social advantages (Fasang and Mayer, 2020). With the rise of post-material values and increased freedom of choice (Inglehart, 1997), privileged individuals may choose to work less or have more flexible working arrangements to pursue personal interests, increasing objective variability and reducing trajectory quality (as it is measured), also at the upper end of the social strata.

Last, a post-material rise in lifelong learning, technological development, knowledge intensification of the labour market, educational inflation, and expansion are expected to produce extended and intermittent educational patterns (Brückner and Mayer, 2005). If prolonged education is followed by stable labour force participation, objective variation will rise, but trajectory quality will not depreciate. However, if discontinuous educational spells coupled with unemployment or marginal labour substitute former stable employment, increasing objective variation will be paired with reduced trajectory quality.

While these mechanisms are anticipated to impact young adults across countries, national institutions and social structures work as 'globalization filters', influencing the degree to which individuals and groups

are affected (Mills and Blossfeld, 2005; Buchholz *et al*., 2009). Previous research confirms this expectation by documenting persistent differences between countries (Billari and Liefbroer, 2010; Nico, 2014; Lesnard *et al*., 2016; Van Winkle and Fasang, 2017, 2021). Relying on the institutional framework of Mills and Blossfeld (2005), this study considers Norway's employment-, and welfare context when deriving hypotheses.

Cohort change at the intersection of gender and social origin

In life-course theory and research, both gender and initial distribution of resources are considered key factors in the formation of the opportunity structures into which people are sorted, thereby structuring life-course patterns (Mayer, 2004; Widmer and Ritschard, 2009; Sirniö *et al*., 2017). Nevertheless, intersectional differences by gender and social origin are seldom considered in the existing literature. Applying an intersectional life-course lens (Fasang and Aisenbrey, 2021; Moen and Miller, 2022), this article contends that intersecting social identities located in specific historical–institutional contexts shape allocation and socialization into different labour market attachment trajectories. Labour market, welfare, and technological changes can impact sub-groups differently, with profound implications for social disparities in work (Moen and Miller, 2022). Hence, while differentiation and de-standardization traditionally refer to population-wide processes, the degree and qualitative content of cohort change may differ by gender and social origin. These concepts are therefore applied here to assess sub-group-level changes.

Zimmermann and Konietzka (2018) argue for a 'pessimistic stance', connecting increasing life-course variation to disadvantage. For cohorts born 1935–1969, they provide evidence that de-standardization in the family domain is more pronounced among the lower educated across seven European countries, including Norway. This study expands this social disparity perspective by considering intersectional differences by gender and social origin in the labour market domain. Social origin is operationalized as parental level of education, considered a broad proxy for the cultural and economic resources provided within the parental home, which is documented to have a sustained influence on young adults' educational achievement and labour market outcomes (Wiborg and Hansen, 2008).

Institutional context

Belonging to the social democratic welfare regime type (Esping-Andersen, 1990), Norway is contemplated to provide relatively strong 'filters' of the negative influences of globalization in general (Buchholz *et al*., 2009; Lesnard *et al*., 2016). In comparative perspective, the economy and labour market are well-functioning (Hyggen and Vedeler, 2021), characterized by generous welfare, family, and social services (Esping-Andersen, 1990), a large public sector and high female labour force participation (Ellingsæter *et al*., 2020); as well as centralized procedures for wage negotiations; strong unions; and high individual job protection for workers on standard contracts (Mills and Blossfeld, 2005). Furthermore, Norway has a strong emphasis, and high use of, active labour market policies (ALMPs) to increase inclusion of young unemployed (Dahl and Lorentzen, 2017; Hyggen and Vedeler, 2021). Business cycle fluctuations during the study period may also counteract a turn towards increasing labour market insecurity in Norway, as the early 1990s was a time of cyclical downturn and higher than average youth unemployment, while the economy improved and unemployment has persisted at lower levels since the late 1990s (OECD, 2022). Jointly, these characteristics may produce more stability in Norway compared with other countries.

However, the Norwegian economy has undergone large transformations theoretically implying increasing labour market insecurity, and several contextual features also suggest that young adults may be less protected by the institutional 'filters' of the welfare state than older individuals. *First*, rapid automatization, digitalization, and restructuring have occurred in the labour market (Ellingsæter *et al*., 2020). Labour immigration increased considerably with the EU expansion to Eastern Europe in 2004 (Statistics-Norway, 2021b). Labour market regulations have been liberalized, including the implementation of the EEA—agreement in 1994 (Ellingsæter *et al*., 2020: p. 35); allowing for labour hiring from temporary help agencies in 2000 (Strøm and von Simson, 2020); and expansion of employers opportunity to use temporary contracts in 2005 (Stjernø, 2020: p. 229). Rising demands for formal qualifications and expansions of the educational system have also resulted in substantial political concern related to secondary school dropout and difficulties of labour market entry for young adults (Ellingsæter *et al*., 2020; Stjernø, 2020).

Second, while providing protection and benefits to permanent employees, the closed and knowledge-intensive Norwegian employment system may make labour market access and establishment comparatively difficult for new entrants and low-skilled (Mills and Blossfeld, 2005; Mills *et al*., 2008), and the youth-to-adult unemployment ratio in Norway is among the highest in Europe (Hyggen *et al*., 2018; Hyggen and Vedeler, 2021). Strong individual job protection coupled with generous sickness and parental benefits increase employer incentives to hire young workers on non-standard contracts to ensure

numerical flexibility and fill in for permanent workers on leave (Olsen and Kalleberg, 2004). Employers' use of non-standard work arrangements is also relatively widespread (Olsen and Kalleberg, 2004), and rates of non-standard employment are high among young adults compared to the population mean (Statistics-Norway, 2022). Furthermore, while individual job protection is strong, collective job protection is comparatively weak (OECD, 2021). Combined with the principle of 'last hired, first fired', this also makes young adults vulnerable during downsizing and collective layoffs. Moreover, despite Norway's high use of ALMPs, evaluations find few positive effects on subsequent employment (von Simson, 2012; Zhang, 2016). Some even argue that they may increase precarity (Greer, 2015), and trajectories of vulnerable youth are shown to be more marginalized after reform of the Norwegian Labor and Welfare Administration (2006–2011), where ALMPs were intensified (van der Wel *et al*., 2021).

Hypothesis

Based on the contextual and theoretical features discussed above, this article contends that while change may be even more pronounced elsewhere, Norwegian young adults can be considered vulnerable to increasing labour market insecurity (Table 2). Hence, we may expect that:

> *Hypothesis 1*: Patterns of labour market attachment among young adults generally move towards rising objective variation and declining trajectory quality (precarization and disintegration).

Conversely, rising labour market insecurity may be restricted to disadvantaged youth (Buchholz *et al*., 2009; Zimmermann and Konietzka, 2018). The open and expanding Norwegian educational system can counteract downward mobility in general, producing increasing objective variation in the form of rising and intermittent education without a turn towards precarization or disintegration. As demands for human capital increase in the labour market, declines in trajectory quality may, therefore, be restricted to those who drop out or do not pursue higher education. As the relationship between social origin and educational achievement is shown to be systematic and enduring across cohorts (Wiborg and Hansen, 2008), precarization and disintegration may only characterize the trajectories of young adults with low-educated parents. We can therefore expect both:

> *Hypothesis 2a*: Rising objective variation among young adults with highly educated parents, without declining trajectory quality.

> *Hypothesis 2b*: Precarization and disintegration only among young adults with low-educated parents.

Furthermore, we may expect gender differences. Overall, female trajectories tend to be more variable and precarious than me's trajectories (Widmer and Ritschard, 2009; Witteveen, 2017; Ramos, 2019), and this may also be the case in Norway. However, cross-cohort precarization and disintegration may be more pronounced among men. While the globalization literature describes stronger labour market

Table 2: Summary of dimensions of cohort change and related expectations.

Type variation		**Dimensions of change:** Objective	**Normative (Sequence quality)**
Concepts		**Differentiation and de-standardization**	**Precarization and disintegration**
Expected type of cohort-change	**(i) General process:** *(Hypothesis 1)*	Among all	Among all
	(ii) Social disparities: *(Hypothesis 2a and 2b)*	Among those with highly educated parents, without depreciation of trajectory quality (*H2a*)	Only among those with low educated parents *(H2b)*
	(iii) Gender disparities: *(Hypothesis 3)*	Only among men	Only among men
	(iv) Intersectional disparities: *(Hypothesis 4)*	Strongest among men with low educated parents (Compared to all other groups)	Strongest among men with low educated parents (Compared to all other groups)

marginalization among women in many countries (Buchholz *et al*., 2009), social democratic welfare states display diverging trends of retained job security among women (Korpi and Stern, 2006). In Norway, female labour force participation has increased across the study period, and family services and allowances (e.g., kindergartens and parental leave) have expanded (Ellingsæter *et al*., 2020). Furthermore, the labour market is highly gender-segregated (Dämmerich, 2015), with a female-dominated public sector that has grown substantially since the early 1990s (Statistics-Norway, 2021a). As the destabilizing influences resulting from globalization are expected to have a stronger impact in the private sector (Mills and Blossfeld, 2005), male trajectories could be more exposed. Also, young men have consistently lower completion rates than their female counterparts throughout all levels of the educational system (Statistics-Norway, 2019). They may therefore be less protected by educational expansions. Hence, we may expect:

Hypothesis 3: Rising objective variation and declining sequence quality only among men.

Last, applying an intersectional theoretical lens, the above arguments may jointly imply that young men of low social origin are especially exposed to increasing labour market risks in the Norwegian context (when compared with other men and women of low social origin). Thus, we can expect that:

Hypothesis 4: Rises in objective variation and declines in sequence quality are stronger among men with low-educated parents than among all other groups defined by gender and social origin.

Data and methods

Data are linked across Norwegian public registers and contain the whole population of young adults in Norway born 1971–1990 (N = 1,108,936). Data sequences consist of seven categorical states indicating annual labour market attachment over 10 years of young adulthood (age 22–31), covering the years 1993–2017. Cohorts born after 1986 are too young to be followed for the whole 10 years and are therefore only included in the analysis of de-standardization, which does not require sequences of the same length. The population is restricted to individuals born in Norway or who immigrated before age 17 and who were alive and registered as residents during the observational window.

Relying on recent advances in sequence analysis (Elzinga, 2010; Gabadinho *et al*., 2011; Studer and Ritschard, 2016; Ritschard, 2021), changes in objective sequence variation are linked to sequence quality changes. Table 1 presents how selected measures relate to theoretical concepts. The measures are further discussed below.

Measuring between-trajectory variation: de-standardization and disintegration

De-standardization is measured by *Transversal entropy* (Shannon, 1948) and by assessing distributional changes in the Complexity index (see below). The Transversal Entropy Index (Gabadinho *et al*., 2011) measures heterogeneity in categorical data and is used here to measure *between*-state variation at specific time points (ages). It is computed separately by cohort and sub-group to evaluate changes in heterogeneity *within* specific groups, thereby representing the degree of age-, and sub-group-specific-, de-standardization. The index takes the value zero if everyone in a population group inhibits the same categorical state at a given age and the value one if the population group is equally divided between all possible states in the alphabet. The normative direction of de-standardization (disintegration) is evaluated by sequence visualization (chronograms) and assessment of distributional changes in the Badness index (see below).

Measuring within-trajectory variation: differentiation and precarization

Differentiation is measured by evaluating *mean* changes in Gabadinho *et al*.'s (2011) *Complexity index*. The measure combines the number of transitions in a sequence with the longitudinal entropy, which also accounts for non-present states in the individual sequence. The measure varies between zero and one, where zero denotes a sequence consisting of only one state. The maximum value is reached if the sequence (i) contains all possible states in the alphabet, (ii) equal amounts of time are spent in each state, and (iii) the number of transitions equals the number of time-units minus one (Gabadinho *et al*., 2011: p. 23).

To assess the normative direction of trajectory change (precarization), the complexity index is supplemented by *The Badness index* (Ritschard, 2021). Several sequence quality measures are available, and their specific features are discussed elsewhere (Ritschard, 2021). The badness index is chosen because it clearly distinguishes between single-spell sequences in different states (employment vs. unemployment), as opposed to, e.g., the degradation index, which only considers upward and downward moves. The badness index measures the sum of the undesirableness degrees of the visited states, each weighted by the potential to integrate the state. The weight of each state increases with the number of occurrences and recency. Hence, the index also accounts for degradation or downward mobility; states occurring near the end contribute more to overall badness. The index ranges between zero and

one, where zero represents a sequence with a single spell in the best state, and the value of one denotes a single spell in the worst state.

To calculate the badness index, the labour market states were assigned a numerical value reflecting the 'badness degree' of the state. A conservative successive ranking was chosen based on the income thresholds in the status alphabet (Badness1, see Table 3). However, the educational state was ranked equal to core labour force participation, making a standard school-to-work trajectory equal in quality to pure core labour force trajectories. The disability state was classified as the most severe, representing for most a permanent exit from the labour market. Because the choice of badness values can impact results, a robustness test was performed by applying a second, more severe, successive penalty to 'bad' states (Badness2). Results are robust across the two specifications (see Supplementary Figure A10). Additional analyses have also been performed using the Degradation Index to ensure the robustness of interpretation across measures. While there are some differences, results remain substantively the same (these results are available upon request).

Two-Part Regression Models for Complexity and Badness

Two-part regression models statistically test the relationship between cohort membership and trajectory variation (Duan *et al.*, 1983; Buntin and Zaslavsky, 2004; Belotti *et al.*, 2015; Boulton and Williford, 2018). The complexity and badness indexes are zero-inflated with positive skewness approximating the gamma distribution for the non-zero values, rendering linear regression inappropriate (see Supplementary Figures A1 and A2). The zero inflation results from the multiple processes generating zero complexity (single-spell sequences in any of the labour market states), and the assignment of zero 'badness degree' to both core labour force participation and education (see Table 3), which is prevalent states. Contending that these indexes behave as semicontinuous variables with true zeros (Boulton and Williford, 2018), the process determining (i) zero versus non-zero values are considered separately from the process determining (ii) the outcome level among those with values above zero. First, a binary logistic regression model is fit for the probability of having zero versus positive values. Second, a gamma regression model (GLM with log link function and gamma response distribution) (Hattab, 2016; Boulton and Williford, 2018) is fitted only for the non-zero population.

Labour Market Attachment States

Operationalization of the yearly labour market positions is based on the Social Exclusion and Labour market Attachment (SELMA) model, previously used in many studies from the Nordic countries (Bäckman and Nilsson, 2010, 2016; Lorentzen *et al.*, 2019). The model is constructed from registry information on income, educational attendance, health-related social insurance receipt, and registered unemployment and sickness absence days during the calendar year (Table 3).

The most important discriminator in the model is individual annual labour market income, which

Table 3 Status alphabet—yearly labour market and educational attachment states and ranking of the states quality

Status	Definition	Badness1 (Main results)	Badness2 (Supplementary Material)
Core labour force	Labour market income equal or above 3.5 PBA	1	1
In education	Labour market income below 3.5 PBA and registered with ongoing education OR receipt of student allowance	1	1
Marginal labour	Labour market income between 0.5 and 3.5 PBA	2	2
Marginal labour with health-related absence	Labour market income between 0.5 and 3.5 PBA and more than 90 days registered sick leave OR registered disability pension OR basic/attendance benefit	2	3
Extensive unemployment (NEET)	Labour market income below 0.5 PBA and more than 182 registered days of unemployment	3	4
Economically marginalized (NEET)	Labour market income < 0.5 PBA	3	5
Disability (NEET)	Labour market income < 0.5 PBA and receipt of disability pension	4	6

includes wage-based work, self-employment, and employment-related social insurance (sickness benefits and family allowances), but not unemployment benefits or student allowance. Individuals are first put into four main categories based on their labour market income and student status: Core labour force; In education; Marginal labour force; and Not in Education, Employment, or Training (NEET). *The core labour force* consists of those with income above or equal to 3.5 Price-Based Amounts (PBA),[1] corresponding to 327,719 NOK (approximately 32,500 EUR) in 2017. The 3.5 PBA threshold corresponds fairly well to the income received from the country's lowest-paid jobs, which also approximates the income needed to maintain one adult for 1 year (Bäckman *et al*., 2011). *In education* consist of those registered with ongoing education in September or have received student allowance the relevant year, if their annual income is below 3.5 PBA. Student allowances are included to capture those who are studying abroad. *The marginal labour* force consists of individuals with income 0.5 –3.5 PBA not registered in education and contains the sub-state *Extensive health-related absence*. The main category NEET consists of individuals not registered in education with income below 0.5 PBA (46,817 NOK or approximately 4,600 EUR in 2017). Incomes below 0.5 PBA are placed outside the labour force because they lie below the taxable income threshold and approximate the income threshold for receipt of full permanent disability benefits. The NEET category is further divided into the sub-states of *Extensive unemployment*, *Disability,* and other *Economically marginalized*.

Analyses are stratified by gender and social origin. *Social origin* is measured by parental level of education when the individual is 16 years old. The original variable contains the five categories of parental *Long higher education*, *Short higher education*, *Secondary education*, *Primary education or less,* and *Unknown*.

Results

Table 4 display descriptive statistics for the population by cohort. The share of young adults who have been in one of the NEET states at least once during young adulthood has declined across birth cohorts, from 26.5 per cent among those born in 1971 to 19.8 per cent in the 1990 cohort. Having parents with high education (i.e. short and long higher education) has increased from 24.1 per cent to 41.4 per cent from the 1971 cohort to the 1990 cohort. The share of young adults with an immigrant background has also increased, from 1.5 per cent among those born in 1971 to 7.8 per cent in 1990.

Differentiation and precarization? Assessing within-trajectory variation

Figure 1 displays average within-trajectory complexity and badness across cohorts for the total population and by gender. There is a detectable but modest linear decline in the complexity index for both genders, and sustained gender differences (higher complexity among women) across birth cohorts. For the badness index, however, gender-specific patterns of change emerge.

The observed gender convergence is caused by a decline in badness among women across the 1970s cohorts, and a linear increase in badness across all cohorts among men. In contrast to expectations from *Hypothesis 1* (general increases), differentiation is not observed as a general process implying a move towards precarization across the population. Rather, while complexity decline among all, the quality of female trajectories improves and then stabilize, while the opposite is observed among men, indicating support for *Hypothesis 3* (precarization among men). Furthermore, we observe that declining complexity is accompanied by gender-specific quality changes of both upward and downward labour market mobility.

In line with the intersectional life-course lens, gender patterns also differ by social origin (Figure 2). *Among women*, social disparities in both complexity and badness are persistently larger and more stable across cohorts than among men. Furthermore, the decline in badness among women is detectable across the social origin categories, contradicting the expectation that precarization is promoted by social disparities alone (*Hypothesis 2b*). In fact, the mean level of badness decreases more among women of low social origin. *Among men*, patterns are substantially dissimilar. Social disparities in complexity are less structured by social origin, and quality (badness) differences are smaller than among women. However, differences by social origin among men increase across birth cohorts. In accordance with the intersectional *Hypothesis 4*, men with low-educated parents stand out as the only group with increasing complexity and a steeper increase in badness than other men. Figure 2 provides no support for the hypothesis of rising objective variation among young adults of high social origin (*Hypothesis 2a*).

Two-part regression models were fitted to statistically test the intersectional pattern of mean cohort change observed in Figure 2. The models contain a three-way interaction between linear time (cohort), gender and social origin, and control for immigrant background.[2] Overall, regression results confirm the observed mean-trends' significance (Figures 1 and 2) and are presented in Supplementary Table A1 and Supplementary Figures A3 and A4). The three-way interaction between social origin, gender, and cohort is significant, confirming an overall intersectional pattern of cohort change, where

Table 4 Population frequency and percentages by cohort, gender, NEET, parental education level, and immigrant background

Cohort	Frequency	% women	% Ever NEET	Parental education level				Immigrant background[a]	
				% Long higher	% short higher	%Secondary	%Primary	% Immigrant	%Immigrant parents
1971	62,351	49.0	26.5	6.8	17.3	57.5	17.8	1.3	0.2
1972	61,441	48.8	25.6	7.3	18.4	57.6	16.1	1.5	0.2
1973	58,796	48.5	25.1	7.5	19.1	57.4	15.4	1.6	0.2
1974	57,332	49.1	24.4	7.7	20.4	56.9	14.4	1.9	0.4
1975	54,074	48.8	23.8	8.1	20.9	57.0	13.6	2.0	0.6
1976	51,473	48.8	23.4	8.5	21.6	56.5	12.8	2.2	0.8
1977	49,377	48.7	23.0	8.9	22.9	54.9	12.7	2.8	1.0
1978	50,054	48.4	22.7	9.1	23.6	54.6	12.1	2.9	1.1
1979	50,177	48.7	22.8	9.2	24.2	53.4	12.6	3.1	1.2
1980	50,032	48.4	22.6	9.6	24.9	52.1	13.0	3.4	1.3
1981	49,913	49.0	22.8	9.6	25.7	51.2	13.0	3.7	1.4
1982	50,507	48.4	22.5	9.8	25.8	51.1	12.6	3.8	1.5
1983	49,689	48.2	21.9	9.8	26.6	49.8	13.2	4.5	1.6
1984	50,094	48.6	21.3	10.0	27.3	49.2	12.7	4.6	1.7
1985	50,789	48.4	21.8	10.1	27.7	48.4	12.9	5.0	1.7
1986	52,445	48.2	21.9	10.5	28.2	47.7	12.7	5.0	1.9
1987	54,095	48.7	21.5	10.3	28.7	47.4	12.6	5.1	2.1
1988	57,529	48.3	21.2	10.4	29.5	47.3	12.0	4.8	2.6
1989	59,634	48.3	20.4	10.4	30.5	46.6	11.7	4.7	2.8
1990	61,900	48.4	19.8	10.6	30.8	46.4	11.4	4.8	3.0
Total	1,081,702	48.6	22.8	9.2	24.7	52.2	13.3	3.4	1.4

[a]Immigrant denotes foreign-born individuals with two foreign-born parents, and *immigrant parents* denote those born in Norway with two foreign-born parents.

the impact of social origin is increasing among men and decreasing among women (see Supplementary Figure A4). Inspection of sub-group-specific average predicted values combining (multiplying) both parts of the two-part models renders an almost identical pattern of sub-group-specific cohort change as seen in Figure 2 (Supplementary Figure A3).

De-standardization and disintegration? Assessing between-trajectory variation

The level of age-specific transversal entropy for selected cohorts was assessed first to evaluate de-standardization. Transversal entropy was calculated on the sub-group level to consider changes in heterogeneity *within* groups defined by gender and social origin. In general, results for transversal entropy display the same sub-group-specific trends as the complexity index, disputing the assumption of a general de-standardization process (*Hypothesis 1*) and supporting the expectation of de-standardization among men (*Hypothesis 3*) and the intersectional *Hypothesis 4*. There is a rise in transversal entropy among men, with the most pronounced changes among those with low-educated parents (Figure 3). Among women, there is more diversity (higher transversal entropy) at all ages of young adulthood, more considerable social origin differences compared to men, and stability across birth cohorts. The transversal entropy analysis for women shows no substantive cohort change and is presented in Supplementary Figure A5. The cohort-specific state-distribution plots for men of low social origin (Figure 4) indicate that the de-standardization observed among men of low social origin is connected to quality depreciation of labour market attachment. Core labour force states still dominate among men of low social origin in the 1990 cohort, but we observe a cross-cohort decline, and a rise in marginal labour and the NEET states. For a comparison of the state-distribution plots of women of low social origin, see Supplementary Figure A6.

Second, cross-cohort distributional changes in the complexity index and the badness index were inspected by cohort and sub-group-specific boxplots (see Supplementary Figures A7 and A8) and statistically tested by use of the two-part regression model,

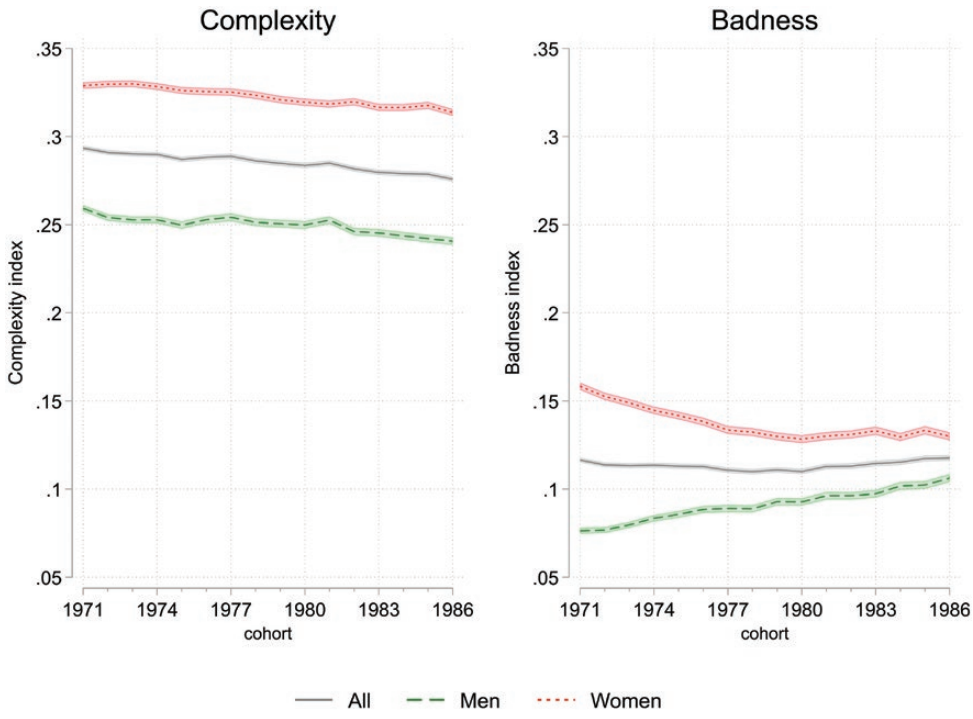

Figure 1 Mean values of complexity and badness by cohort for the total population and by gender with 95% CIs

which provides separate estimates for the development of zero- vs. non-zero values across the birth cohorts. Results show that the de-standardization observed among men takes the form of *trajectory polarization* rather than *disintegration*. Figure 5 presents the average predicted values from both parts of the two-part regression model for the badness index. Results for Complexity show similar patterns for men of low and intermediate social origin and are provided in Supplementary Figure A9.

For the male population, Figure 5 reveals a cross-cohort increase in (i) the average probability of zero badness, but also an increase in (ii) the predicted mean *levels* of badness among those with values above zero. Hence, for younger cohorts, perfectly secure labour market and educational attachment trajectories consisting of only education and core labour force participation become more common, simultaneously as trajectories become more precarious (rising levels of badness) among those badness values above zero. These results indicate that the concept of *disintegration*, understood as a 'process where 'good' states and the sequences in which they occur become less universal for given population groups', is not an accurate description of the changes observed among men. Instead, we observe polarization of trajectory quality. Among women, there is no tendency towards polarization. Rather, the quality of female trajectories becomes somewhat less dispersed, with a rising probability of perfectly secure trajectories (zero badness values), and overall stability in badness levels among those with values above zero (Supplementary Figure A8 displays the same gender-specific trends by cohort-specific boxplots).

Table 5 summarizes how results for cross-cohort changes correspond to the theoretical expectations.

Discussion and Conclusions

This article aimed to evaluate the general claim, and normative direction, of differentiation and de-standardization processes, using high-quality registry data to follow 20 complete Norwegian birth cohorts (N = 1,108,936) experiencing young adulthood (ages 22–31) in a time of rapid labour market changes (1993–2017). Objective life-course variation and sequence quality measures were applied to assess gender and social origin-specific changes in labour market attachment trajectories across cohorts.

Results show modestly declining complexity across cohorts on the population level and quality improvements in trajectories of women entering young adulthood during the 1990s. This does not yield support for the hypothesis of increasing volatility or insecurity in labour market attachment patterns among young adults in general. However, both within-cohort

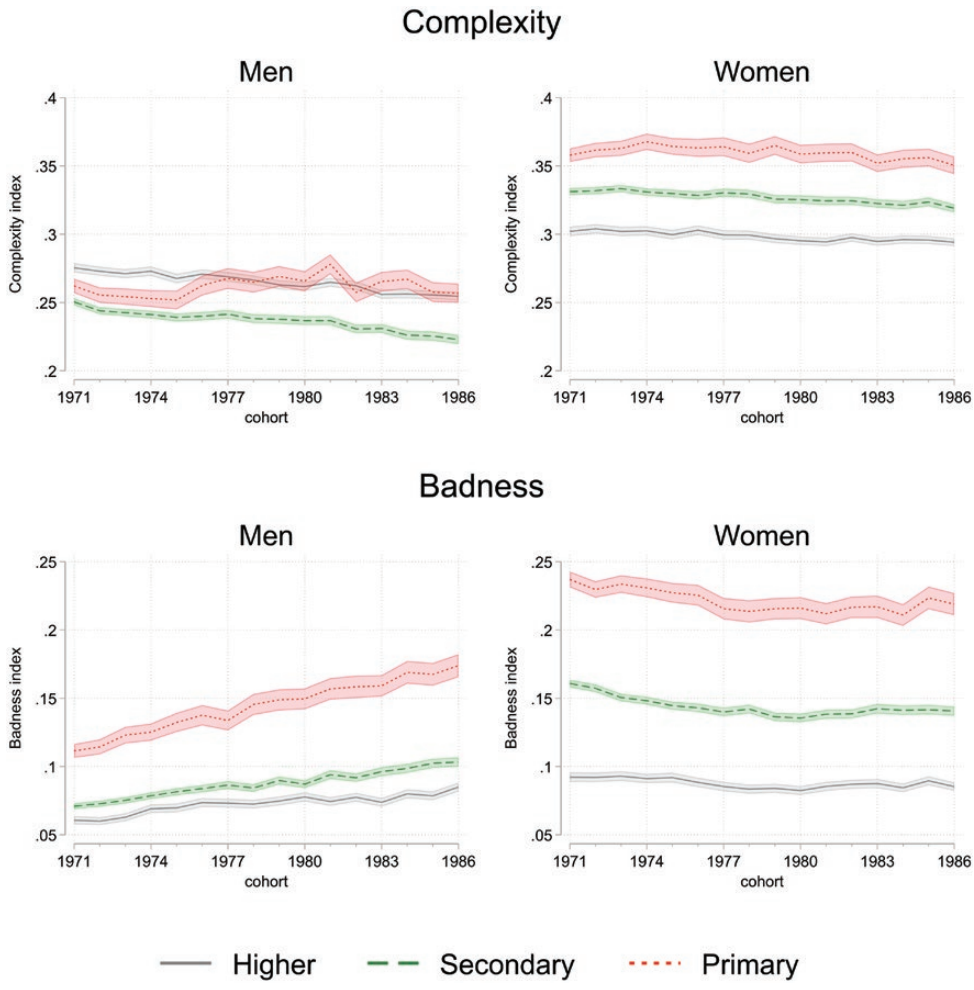

Figure 2 Mean values of complexity and badness by cohort, gender, and parental level of education with 95% CIs

variability and cross-cohort development differ by gender and social origin, indicating intersectional patterns of change. Women's trajectories are persistently more complex than men's, more strongly structured by social origin, and display stability across the 1980s cohorts. Among men, there are signs of a linear move towards precarization and de-standardization, especially for men of low social origin, in line with theoretical expectations. Yet, the de-standardization observed among men takes the form of rising divisions between 'good' and 'bad' trajectories rather than one-directional *disintegration* of previously stable labour force courses. Hence, de-standardization takes the form of *life-course polarization* in the Norwegian case.

The lack of general increases in variability reverberates previous research suggesting more stability in the past than commonly assumed. Van Winkle and Fasang (2017) find that for cohorts born 1916–1963, cross-cohort change in employment complexity is negligible compared to country differences. Brückner and Mayer (2005) did not find support for de-standardization in German cohorts born up until 1971. However, these studies conclude not to generalize into the future, as variability may only increase for later-born cohorts. Brückner and Mayer (2005) also observed profound changes in the youngest cohort of their study, and Van Winkle and Fasang (2021) found support for a moderate increase in complexity when including cohorts born 1964–1966 and extending the time frame of their previous analysis. Biemann *et al.* (2011) found only a slight increase in early work career complexity in German cohorts born 1930–1971 and concluded that the impact of globalization might be exaggerated. The present study strengthens and extends this argument into the 1990s and 21st century. Contrary to discourses on young adults as 'the losers of globalization' (Mills *et al.*, 2005; Buchholz *et al.*, 2009), but in line with

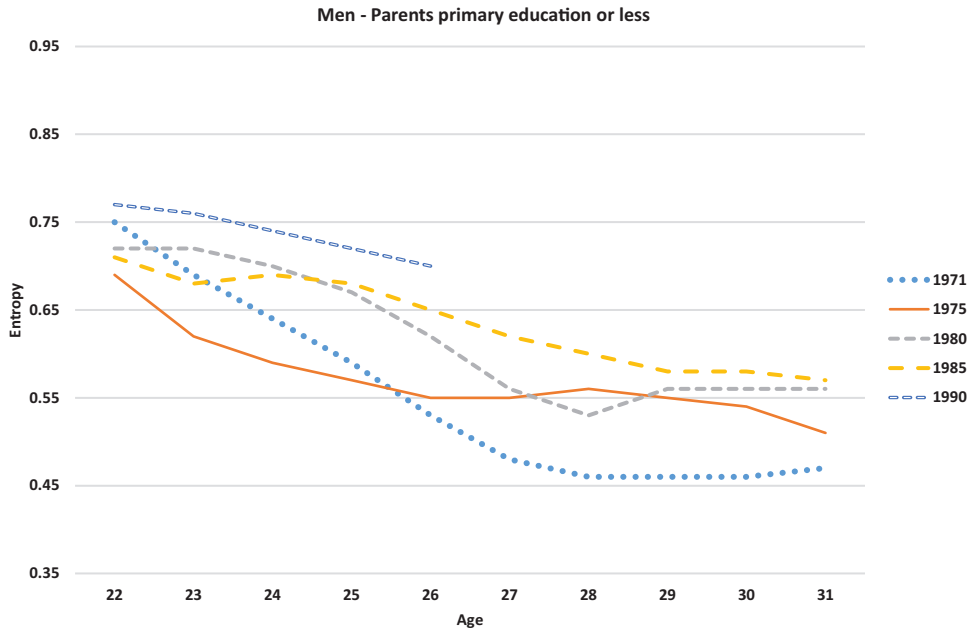

Figure 3 Transversal entropy (within group heterogeneity) among men of low social origin by age for birth cohorts 1971, 1975, 1980, 1985, and 1990

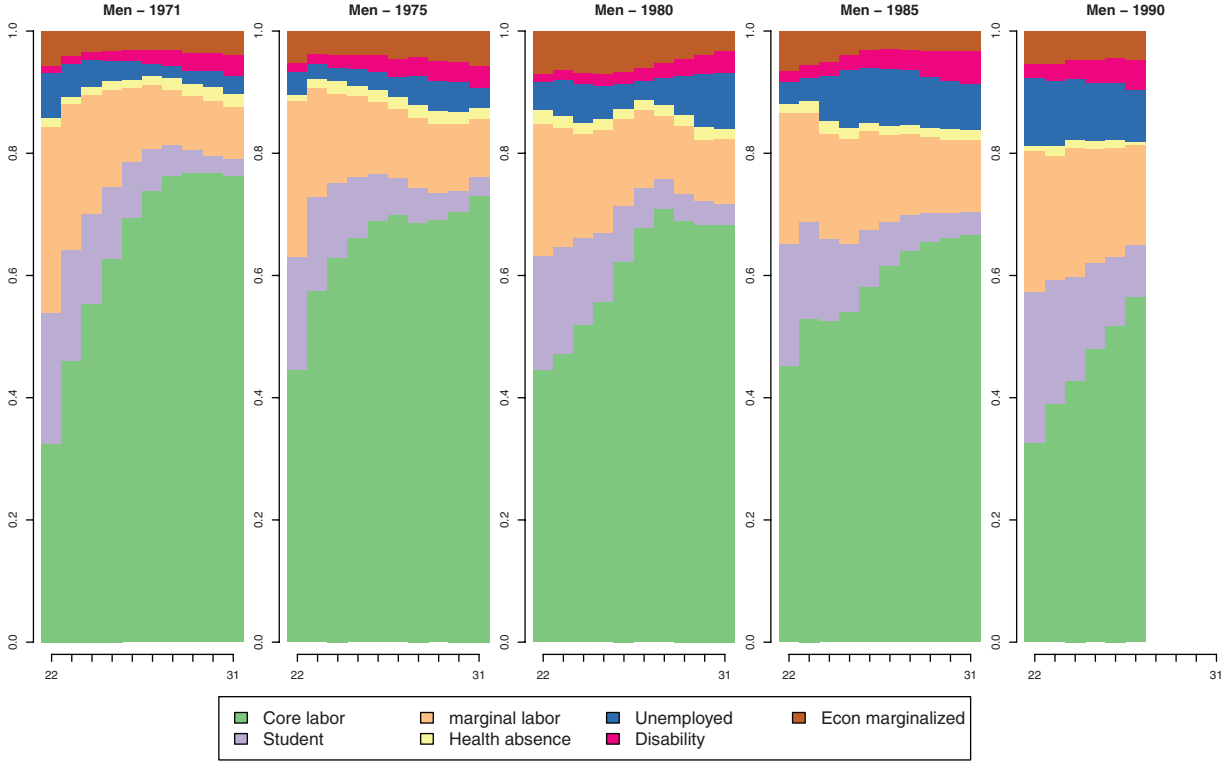

Figure 4 State-distribution plots for men of low social origin by age for birth cohorts 1971, 1975, 1980, 1985, and 1990

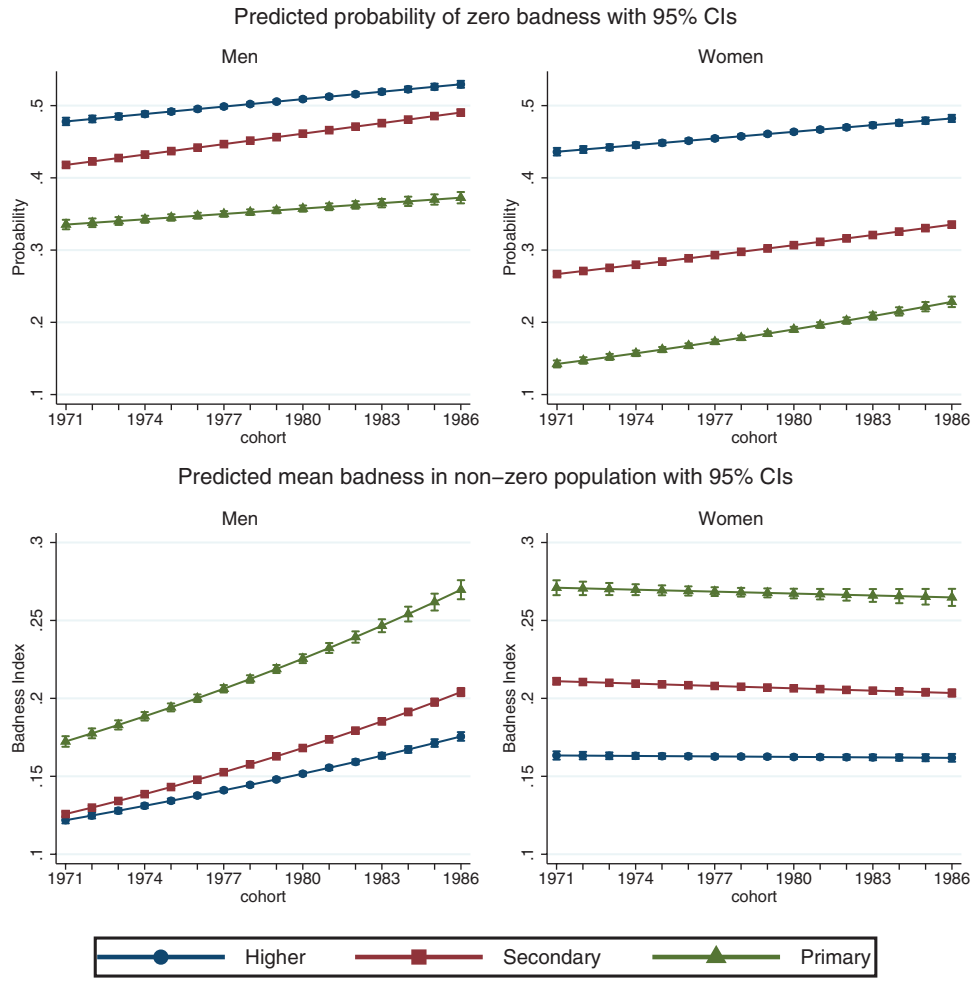

Figure 5 Average predictions from two-part regression model for the badness index by cohort, gender, and parental education level

Note: Sub-group-specific predictions from both parts of the two-part regression model are displayed separately. Top panel: average predicted probabilities of zero (versus non-zero) values on the badness index. Bottom panel: average predicted levels of badness among those with badness values above zero.

previous research, results challenge the commonly claimed notion that young adults, in general, go through increasingly complex and de-standardized school-to-work trajectories.

The gender differences and social disparities found in the present analysis echo classical insights from life-course theory, highlighting the importance of institutional-, historical-, and class-based contexts in the structuring of trajectories (Mayer, 2004; Mortimer and Shanahan, 2004; Möhring, 2016). However, while previous research has documented gender and social disparities separately, this study indicates that social origin interacts with history in differing ways among men and women.

First, while social disparities among women show a modest decline across the 1970s cohorts, they remain sizeable and stable after that and are substantially larger than among men. Results for the female population thus provide evidence for the continued importance of social origin in the shaping of trajectories, in line with theoretical accounts of standardization processes, where institutional and cultural mechanisms produce gender and class-specific life-course patterns (Mayer, 2001, 2004; Mortimer and Shanahan, 2004; Kohli, 2007).

Second, results show that within the gender-segregated Norwegian labour market, male trajectories have polarized and become more precarious at the mean, while female trajectories have become more secure. Previous studies have also documented gender differences (Berger *et al.*, 1993; Brückner and Mayer, 2005; Nico, 2014; Lesnard *et al.*, 2016), and

Table 5: Summary of hypothesis and main results for cross-cohort changes in labor market trajectories.

Type of cohort change:			(i) General process	(ii) Social disparities		(iii) Gendered Process	(iv) Intersectional Process
Expected to be observed among:			*Hypothesis 1:* All	*Hypothesis 2a:* Youth of high social origin	*Hypothesis 2b:* Youth of low social origin	*Hypothesis 3:* Men	*Hypothesis 4:* Men of low social origin
Dimensions:		Concepts:					
Objective	**Within trajectory**	**Differentiation**	Not supported	Not supported	Not supported	Not supported	Supported
	Between trajectory	**De-standardization**	Not supported	Not supported	Not supported	Partly supported, polarization of complexity among men of intermediate and low social origin	Supported
Normative	**Within trajectory**	**Precarization**	Not supported	--	Not supported	Supported	Supported
	Between trajectory	**Disintegration**	Not supported	--	Not supported	Disintegration not supported, but quality-polarization observed	Disintegration not supported, but quality-polarization stronger than among other men and women

evidence suggest gender convergence in labour market attachment patterns up until the 1970s resulting from changes among women towards more work-oriented trajectories (Heinz, 2004; Widmer and Ritschard, 2009). In the 1970s, however, there is evidence of decreasing stability among men (Berger *et al*., 1993). The present study confirms a continued pattern of gender convergence also during the 1990s and 21st century, resulting from cross-cohort change in opposing normative directions. However, while previous studies of gender differences have not considered social disparities, this study shows that gender convergence is propelled at the lower end of the social strata. Young men of low social origin are converging towards a more precarious and de-standardized pattern, indicating a rise in the structuring influence of social origin over time among men.

Third, by considering intersectional differences, this study contributes to the debate on the normative implications of trajectory volatility and its link to social inequality (Zimmermann and Konietzka, 2018; Fasang and Mayer, 2020). Zimmermann and Konietzka (2018) argue that de-standardization in the family domain is connected to deprivation. The present study strengthens and expands this line of argument into the domain of labour market attachment by confirming that trajectories are more dispersed and precarious at the lower end of the social strata, and that de-standardization among men is propelled by disadvantage and connected to precarization at the mean. However, this study also calls for theoretical refinement by providing evidence that the structuring influence of social origin both differs between the genders and is changing over time. Furthermore, modest declines in complexity are accompanied by gender-specific quality changes in opposing directions, indicating that objective variation changes may imply both upward and downward labour market mobility.

This research has limitations. The coding of labour market statuses affects what changes can be detected between cohorts. The use of aggregated yearly states is necessary to ensure comparability between cohorts. However, a more detailed coding scheme applying monthly statuses and more fine-grained categories would reveal more and other types of variability. Furthermore, while a linear cohort variable was used for the two-part regression, not all cohort trends are linear, and further research is needed to account for the specific reasons why changes occur across certain cohorts. Specifically, the decline in badness among women happens across the 1971–1979 cohorts, corresponding both to a general improvement of the Norwegian economy and the first large expansion of kindergarten services across the 1990s.

Despite these limitations, this study contributes to life-course research both empirically and theoretically.

First, a strength of this research is the application of detailed full-population registry data. Previous research on the transition to adulthood is often based on first occurrences of important life events rather than mapping of longer-term trajectories (Billari and Liefbroer, 2010; Nico, 2014; Lesnard *et al*., 2016). Adding to the literature examining labour market attachment as longitudinal trajectories (Biemann *et al*., 2011; Van Winkle and Fasang, 2017, 2021), this study accounts for reversibility in transitions, avoiding recall errors and the fallacy of assuming stable labour market attachment by proxy of the first job. *Second*, by evaluating cohorts not previously studied, findings provide new evidence challenging the notion that globalization generally increases labour market insecurity. *Third*, while Brückner and Mayer (2005) early argued that differentiation and de-standardization are distinct processes, previous research largely considers either one or the other (Widmer and Ritschard, 2009; Biemann *et al*., 2011; Van Winkle and Fasang, 2017; Van Winkle, 2018; Zimmermann and Konietzka, 2018), or do not adequately distinguish between them empirically (Berger *et al*., 1993; Nico, 2014). The present study applies both concepts and illustrates that changes at the mean are accompanied by an underlying process of polarization among men. *Last*, the empirical evidence presented for the gender differences in social disparities gives reason to conclude that neither the gender perspective nor the social disparity perspective applied in previous research is in themselves sufficient to understand the group-specific patterns of trajectory change. This study indicates that several dimensions of inequalities interact in the historical structuring of life-course patterns. Overall, findings point to the need to develop more specific intersectional research perspectives in life-course research.

Notes

1. The Price-Based Amount (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.
2. *Immigrant background* is a three-category variable where *Norwegian background* denotes everyone with at least one Norwegian-born parent, *immigrant* denotes foreign-born individuals with two foreign-born parents, and *immigrant parents* denote those born in Norway with two foreign-born parents.

Supplementary Data

Supplementary data are available at *ESR* online.

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