

Social Origin and Students' Trajectory Patterns at German Universities

A Sequence-Analytical Approach¹

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Abstract

While the relationship between the transition to higher education and social origin has been widely investigated, much less is known about study trajectories, that is, the study patterns between enrolment and graduation (or terminal dropout). This paper fills this gap by responding to the question: 'How do students of different social origin progress through their bachelor's studies at German universities?' Based on explanations of how academic-cultural and economic resources are related to social origin, opposing hypotheses regarding students' social origin and their experience of linear, as opposed to less linear, higher education trajectories are developed. The analysis is based on a panel study with bachelor students at German universities (National Educational Panel Study, NEPS). Trajectories are reconstructed using sequence analysis, yielding six different higher education trajectory types. The results of the multinomial logistic regression models reveal that students with low

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This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0. From 2008 to 2013, NEPS data were collected as part of the Framework Programme for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, the NEPS survey has been carried out by the Leibniz Institute for Educational Trajectories (LifBi) at the University of Bamberg in cooperation with a nationwide network.

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educated parents are at greater risk of following incomplete and more complex study trajectories. Compared with those students who experience a linear trajectory, the divergence in paths is partly explained with reference to differences in academic achievement, but also, to some degree, with reference to other resource differences.

Keywords

Sequence Analysis; Study Trajectories; Inequality in Higher Education; Educational Pathways; Social Origin

Wie beeinflusst die soziale Herkunft die Studienverläufe von Bachelorstudierenden an deutschen Universitäten? Eine Rekonstruktion mittels Sequenzmusteranalyse

Zusammenfassung

Während die soziale Herkunft von Studierenden beim Übergang ins Hochschulsystem bereits häufig im Fokus stand, haben Studienverläufe – die Bildungsphase zwischen der Erstimmatrikulation bis zum endgültigen Studienabschluss (oder Abbruch) – bisher weniger Beachtung erfahren. Ausgehend von der Frage, ob und wie sich die Studienverläufe von Bachelorstudierenden unterschiedlicher sozialer Herkunft unterscheiden, versucht dieser Artikel diese Forschungslücke zu schließen. Auf der Grundlage der Verteilung akademisch-kultureller und ökonomischer Ressourcen werden konträre Hypothesen zum Zusammenhang zwischen der sozialen Herkunft der Studierenden und der Komplexität ihrer Hochschulverläufe entwickelt. Empirische Grundlage dieser Studie bildet die Studierendenkohorte des Nationalen Bildungspanels (NEPS). Die Rekonstruktion der Studienverläufe von Bachelorstudierenden mittels Sequenzmusteranalyse resultierte in sechs Studienverlaufstypen. Multinomiale logistische Regressionen ergaben, dass vor allem Studierende aus niedrig gebildeten Elternhäusern häufiger einen (noch) nicht abgeschlossenen Studienverlauf und andere komplexe Studienverläufe aufweisen. Im Vergleich zu Studierenden, die einen linearen Standardstudienverlauf aufweisen, sind diese Unterschiede vor allem auf Unterschiede in den vorherigen Leistungen zurückzuführen, zu einem kleineren Teil jedoch auch auf Unterschiede in den von Eltern bereitgestellten weiteren Ressourcen.

Stichworte:

Stichworte: Sequenzmusteranalyse; Studienverläufe; soziale Ungleichheit im Hochschulsystem; Bildungsverläufe; Soziale Herkunft

Introduction

Despite expanded access in recent decades, higher education participation in Germany is still stratified by social origin. While almost 87 per cent of upper secondary school leavers with academically educated parents enter higher education, that number is only 47 per cent for upper secondary school leavers from non-academic backgrounds (Kracke et al. 2018). Higher education enrolment also does not equate to study completion. As higher education attainment is a long process that requires a high degree of initiative and commitment from young adults, some students get lost along the path towards degree completion. It is against this backdrop that research into predicting and preventing dropout has emerged in relation to – although not only – students' social origin (Müller/Schneider 2013; Sarcletti/Müller 2011). Yet, focusing solely on study completion and dropout undermines the fact that students' actual enrolment patterns are often more complex. Students may change their field of study, delay degree completion or interrupt their studies for some time. In fact, a focus on the actual enrolment patterns – that is, a perspective on what happens between first-time enrolment and degree completion – is largely missing for students in German higher education.

A view of the international state of the literature shows that the progress or study pathways through higher education have been widely investigated, particularly in the US context (Haas/Hadjar 2020). Research shows that students from advantaged social backgrounds are not only more likely to complete their studies, but are also more likely to experience “traditional” enrolment patterns characterised by a higher incidence of full-time enrolment. Overall, their study trajectories are also more linear, meaning that they interrupt their studies less often and transfer less often from college to college or programme to programme. Furthermore, students from advantaged backgrounds are also less likely to fall behind in terms of study progress (Goldrick-Rab 2006; Goldrick-Rab/Pfeffer 2009; Lassibille/Gómez 2011; Milesi 2010; Pfeffer/Goldrick-Rab 2011).

However, these findings are not straightforwardly applicable to the German context. Higher education in Germany is characterised by a high degree of regulation, funding shortages and the dominance of the public universities. In the past, not much emphasis was placed on the needs of non-traditional students. Thus, although slowly changing, part-time studies and other flexible study formats still constitute the exception. By contrast, in many other countries, higher education exhibits a stronger market orientation, accompanied by a highly diversified institutional landscape and a stronger reliance on private investments. This results in an unregulated study offer which could be overwhelming in the scope of opportunities presented, complicating study decisions and outcomes (Callender/Dougherty 2018; Dougherty 2018).

Aiming to fill this gap in the German context, this article focuses on the study trajectories of students in German universities in relation to their social origin, with two aims. The first is to provide an overview of study trajectory patterns of first-time enrolling bachelor's degree students at German universities beyond common indicators such as the dropout rate. Second,

this study attempts to answer the main analytical question of whether a lower social origin is also related to a less linear study trajectory in the German higher education context.

The analysis is based on the National Educational Panel Study (NEPS; Blossfeld et al. 2011) and considers study trajectories over a period of more than five years after first-time enrolment. Sequence analysis – a method of identifying (dis-)similarities in time-ordered data – followed by cluster analysis identifies six distinct study trajectory types. Subsequently, the association between these trajectory types, social origin as well as the underlying explanatory mechanisms are investigated.

Theoretically, it is presumed that social origin is multidimensional and shapes higher education attainment through several channels (Blossfeld 2019; Bukodi/Goldthorpe 2012). The higher education experience of the parents provides relevant cultural resources, including knowledge about university studies and preferences for higher education. The occupational status of the parents allocates economic resources, thus allowing the children to fully concentrate on their studies.

This paper contributes to the current state of research on social stratification and mobility mechanisms in higher education along three lines. First, it provides empirical insights into the relationship between social origin and study trajectories in German higher education. Second, it contributes to understanding the mechanisms of how social origin shapes outcomes in higher education beyond major transitions, by investigating students' actual enrolment patterns. Third, as a methodological contribution, sequence analysis – which has become increasingly popular over the last two decades – is applied to study trajectories, thus adding to our methodological tool box for investigating the complexity of study patterns in higher education.

State of research

Social origin and higher education attainment from an educational transitions perspective

Social origin is a major determinant of higher education enrolment as well as regarding the specific pathway pursued within higher education. Secondary effects, that is, parental influence in educational decision-making beyond achievement, are crucial in explaining school leavers' choices (Boudon 1974). Adolescents assess the likelihood that they will successfully complete higher education, the benefits of an academic degree as well as the monetary, temporal and social costs – a process that is systematically shaped by their social origin (Becker/Hecken 2008; Neugebauer 2015; Peter/Zambre 2017; Schindler/Lörz 2012; Schindler/Reimer 2010; Spangenberg/Quast 2016). As a result, school leavers of low social origin more frequently opt for vocational education and training instead of entering higher education. Furthermore, students from advantaged backgrounds increasingly opt for universities with an excellent research reputation, although such effects are certainly much less pronounced in German higher education compared to more stratified systems (Shavit et al. 2007; Weiss/Schindler 2017; Weiss et al. 2015).

Several studies show that it is not only the initial higher education enrolment that is linked to social origin, but also later transitions within higher education – such as entering master’s or doctoral studies – which can be explained with reference to path dependencies, differences in career preferences and cost sensitivity and also, to varying degrees, to a primary effect of social origin (Auspurg/Hinz 2011; Kretschmann et al. 2017; Lörz et al. 2015; Lörz/Seipelt 2019; Neugebauer et al. 2016). Providing a sequential transition perspective, studies considering the entire educational career from first-time enrolment to doctoral studies reveal two notable facts. First, the effect of social origin decreases over the higher education career, and second, the decision to enrol for the next level of education is more strongly shaped by social origin than is the completion of the respective level of education (Bachsleitner et al. 2020; Lörz/Schindler 2016).

The social origin-higher education nexus beyond transitions

The previous sections stress the scope of social origin differentials at major milestones along the higher education pathway. Yet, the higher education attainment process comprises more than that, considering that students may revise their enrolment decisions or deviate in other ways from ideal pathways through their study programmes.

Higher education dropout is a well-investigated phenomenon in this regard. The main determinants are a lack of motivation, poor achievement, financial hardship and unrealistic expectations (Georg 2009; Hadjar/Becker 2004; Heublein 2014; Heublein et al. 2010; Heublein/Wolter 2011). Regarding the influence of social origin, Müller and Schneider (2013) and Sarcletti and Müller (2011) argue that students of a high social origin have a lower risk of dropping out of university, and that this effect is mediated by their prior educational career. Furthermore, students who have completed vocational training are more likely to completely drop out of higher education, whereas students who follow the academic route into higher education tend to re-enrol after leaving their initial study programme (Tieben 2020). However, subject switches are still a rather neglected theme in the German higher education context (Meyer et al. 2021).

Regarding the time taken to complete a degree programme, exceeding the indicated standard duration of study is widespread among German university graduates. In 2016, the median study duration of bachelor’s degree students was 7.6 semesters. The first quartile was at 6.3, indicating roughly that only a quarter of all bachelor’s degree students at universities complete their studies within the default study duration of six semesters (Autorengruppe Bildungsberichterstattung 2018). In fact, many students already fall behind in their first year of study with a high level of work intensity identified as a major reason for delayed graduation (Bargel et al. 2009; Behr/Theune 2016). Yet, of those who graduate “late”, a proportion of students also deliberately decide to extend their studies to, for example, deepen their interest and to gain further experience by going abroad, doing non-compulsory internships or gaining work experience alongside their studies (Majer 2015; Penthin et al. 2017). In this vein, it has been found that students from advantaged social backgrounds are geographically more mobile and are also more likely to go abroad during their studies (Auspurg/Hinz 2011; Kratz 2012; Netz/Finger 2016).

In sum, these empirical findings on the relationship between social origin and study trajectories show that the effect of social origin on decision-making processes at educational transitions within higher education has been in focus, and that some less structured decision-making processes, such as whether or not to leave higher education, have also been studied. However, there is clearly a gap regarding students' actual enrolment and trajectory patterns in general, and specifically in relation to social origin.

Theoretical considerations: How social origin shapes study trajectories

Educational decisions and study trajectories

In sociological theories on educational attainment, the effect of social origin is often conceptualised as a two-stage model. First, family background positively affects achievement through a learning-oriented and stimulating home environment. Second, educational career decisions, including higher education-related ones, are shaped by socially stratified judgements of risks, costs and benefits (Boudon 1974; Breen/Goldthorpe 1997; Kristen 1999).

However, decisions along one's higher education pathway certainly differ from the decisions made earlier in one's educational career at least for three reasons. First, higher education is a non-compulsory level of education; second, educational decisions within higher education are less institutionalised; third, students are more mature compared to earlier educational phases. This means more autonomy, but requires students also to be proactive. For some students, studying can be a highly contingent process, including many unforeseen incidents such as having to repeat exams or to switch subjects. Other students may simply follow the suggested course outline until degree completion. Thus, study trajectories are conceptualized here as the outcomes of both intentional decisions and unforeseen or unscheduled circumstances. Against this background, it is argued that social origin has a subtle effect on study trajectories, through the provision of cultural and economic resources, as described in more detail in the following sections.

Social origin, cultural resources and study trajectories

Taking Bourdieu's widely acknowledged concept of cultural capital as the point of departure, it is proposed that students' social origin and their study trajectories are linked by a cultural resource mechanism related to parents' education (Bourdieu 1986; Bourdieu/Passeron 1979; Winkle-Wagner 2010). Parental education is the most important social origin parameter to shape a child's educational attainment (Buis 2012). Children in highly educated families benefit from the educational affinity of their parents, their parent's support and a stimulating home environment, which consequently "converts" into academic achievement (De Graaf/Kraaykamp 2000).

While it can be assumed that this association decreases over the educational career, students may also benefit from such accustomed habits and practices in the long run, for example by relying on well-proven learning strategies or internalised academic working habits. Hence, academically better prepared students may also feel less burdened in higher education, such as when facing a high course work load or having to sit lots of exams in a short period of time.

Consequently, this may enable students from highly educated families to stick to a pre-given ideal study pathway.

In addition, parents also share their personal educational experiences about the (higher) education system, thereby helping their child navigate higher education. In fact, “know-how” about the education system in terms of educational routes and connections has a positive effect on children’s educational success in secondary education – an educational stage with ample parental influence (Barone et al. 2018; Forster/van de Werfhorst 2019). While students in higher education are more mature and independent compared to pupils in secondary education, parents still have a “facilitating” influence over their children in higher education. Parents may stress the benefits of higher education, may explain how course organisation works, or may correct students’ expectations on course contents or employment options of certain study fields. Thus, students originating from academic families are typically advantaged in that their parents enable them to develop tangible and realistic expectations regarding the study trajectory they pursue and beyond (Hamilton et al. 2018; Spiegler 2018).

Taken together, it is suggested that parental education shapes the study trajectory of a student via the academic-cultural resources provided. Whereas cultural resources may enable students to proceed smoothly through higher education, students from non-academic households may face a higher likelihood of experiencing less linear study trajectories, that is, experiencing study interruptions, subject switches or delays in degree completion in the absence of cultural resources.

Social origin, economic resources and study trajectories

The second resource type considered here is parents’ economic resources. With regards to a direct transmission mechanism, less affluent families provide fewer monetary resources to support their offspring during their studies. Hence, these students depend to a greater extent on public financial aid, study loans or employment. Yet, students who spend many hours working have less time to concentrate on their studies – a circumstance that hinders study progress (Behr/Theune 2016; Bozick 2007; Roksa/Velez 2010; Triventi 2014).

Against this background, it is hypothesised that students who are economically less well supported by their parents are less likely to follow a standard trajectory through higher education. Instead, they could be forced to slow the pace of their studies and spread their course work over a longer time period, despite being enrolled on a full-time basis.

The paradox of resource endowments: Facilitating or complicating study trajectories?

The main argument of the previous sections is that a low social origin results in more complex trajectories characterised by interruptions, delays or enrolment changes due to a lack of economic and cultural resources. However, it is also plausible that the provision of cultural resources and the reliance on economic resources has converse effects.

Higher education studies do not only fulfil the purpose of qualification. Studying also means stimulation and exploring themes of interests (Pallas 2003; Penthin et al. 2017; Scharf et al. 2019). Yet, such a perception could be socially stratified and prevailing in families where

higher education is highly valued – likely because parents have obtained higher education degrees themselves. In this vein, higher education might be perceived as a phase of orientation and to experience a carefree period before life starts to get serious (Merenluoto 2009). Consequently, students may spend more time in higher education to deepen their interests instead of obtaining the required qualifications in an intentional and straight forward way, even if this means deviating from a linear study trajectory. From this perspective, parents' cultural resources could be facilitating, making sure that their children will eventually complete their studies despite these deviations (Bourdieu/Passeron 1979).

What is more, the reliance on parents' economic resources could further facilitate such orientations. Even if students are economically independent from their parents, the knowledge that there is a financial safety net provides them with some leeway in the case of unforeseen events such as failures or re-orientations that lead to prolonged study pathways (Bernardi 2014). Furthermore, students who have economic resources at their disposal can also intentionally take longer to finish their studies. They might undertake internships, study abroad or spread their course work and exams over a longer period and thereby secure better grades, which could provide a strategic advantage when it comes to admission for master's studies or labour market entry (Zarifa et al. 2018).

By contrast, students with a low social origin have been found to take a more instrumental view regarding education (Bargel/Bargel 2010; Hällsten 2010; Lehmann 2009; Longwell-Grice 2003). Being unable to buffer unforeseen events, they are more likely to follow a strategy of adaptation: either sticking closely to a pre-given study structure to avoid unforeseen extensions and detours – or turning their backs completely on higher education for fear of unexpected changes.

In sum, this section proposes an opposing effect of parental resources, namely that students who cannot rely on their parents' economic and cultural resources try to follow linear study trajectories as a strategy of adaptation, whereas students that can rely on parental resources are prepared to deviate from a pre-given standard trajectory, thereby accepting more complex study trajectories.

Summary of research questions and hypotheses

The main research question to be answered is whether study trajectories, or, to be more specific, the degree of linearity of study trajectories, differ by social origin. Against this background, the theoretical arguments of the previous paragraphs yield opposing hypotheses.

On the one hand, it is hypothesised that students whose parents obtained a high level of education, specifically a university degree, are more likely to experience linear study trajectories. They have more cultural resources at their disposal, which helps them to fulfil the academic requirements and to navigate higher education well. Second, their parents' economic support facilitates a smooth trajectory, allowing them to concentrate fully on their studies. Thus, from this perspective, it is hypothesised that:

(H1) the higher the social origin, the more likely it is for students to follow a linear trajectory through higher education,

via the allocation of cultural and economic resources.

On the other hand, there are also convincing theoretical arguments suggesting the opposite, that is, the provision of resources allows students from advantaged social backgrounds to deviate from standard pathways through higher education or to prolong their studies. Thus, it follows that:

(H2) the higher the social origin, the less likely it is for students to follow a linear trajectory through higher education.

These hypotheses could be tested against a null hypothesis that social origin has no effect on the study trajectories. As the German education system is marked by strong path dependencies, university students are a preselected subgroup of an age cohort – those who excelled in terms of academic achievement at earlier transitions. Thus, assuming that university students are a fairly homogeneous group regarding ability and motivation and that they are independent from their families, the social origin of students may have no significant influences on their study trajectories.

Data and methods

Data set and preparation of the analytic sample

The analysis is based on the starting cohort 5 ‘First-year students’ of the National Educational Panel Study (NEPS; Blossfeld et al. 2011). The NEPS is a multi-cohort panel study focusing on educational processes, covering competence development, learning environments and other themes.

First-year students who enrolled in the winter term 2010/2011 in German public and state-approved higher education were followed throughout their studies, with alternating data collection modes. The survey design is based on a stratified clustered sampling approach in which the clusters consist of separate university disciplines.

Panel attrition is a major threat to validity in all panel studies. This survey is not exempt from this, given that students are a mobile population. So far, two studies investigated the panel attrition in the NEPS student cohort in more detail (Liebeskind/Vietgen 2017; Zinn 2017). Table 1 displays the attrition from the original sample to the analytic sample. Roughly indicating whether the data preparation changed the sample composition, the last column depicts the proportion of students whose parents obtained a university degree. Tentatively, the social origin bias in panel attrition seems small. However, no final conclusion can be drawn given that the characteristics of a baseline population – i.e. of the actual student population – remain unobserved. Consequently, the extent to which the student population differs from the sample in the initial survey wave remains unobserved.

Table 1: From the original to the analytic sample.

| Data preparation steps (exclusion criteria) | Case loss (absolute/relative terms) | | Remaining obs. (absolute/relative terms) | | % parent(s) univ. degree |
|--|---|---------------|--|---------------|-----------------------------------|
| Original sample, wave 1 | | | 17,909 | | 35.1 % |
| Panel attrition: not participated in last survey waves (10, 12, 13, 15) | 7,574 | 42.3 % | 10,335 | 57.7 % | 37.2 % |
| Excluded: students in dual studies; not in bachelor programme | 3,330 | 18.6 % | 7,005 | 39.1 % | 35.5 % |
| Excluded: implausible cases (i.e. very short trajectory; initial enrolment later than 12/2010) | 96 | 0.5 % | 6,909 | 38.6 % | 35.6 % |
| Excluded: students who initially enrolled at a university of applied sciences | 1,954 | 10.9 % | 4,955 | 27.7 % | 40.0 % |
| Exclusion due to missing information on covariates | 122 | 0.7 % | 4,833 | 27.0 % | 40.0 % |
| Analytic sample | | 73.0 % | 4,833 | 27.0 % | 40.0 % |

Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

The sample comprises students enrolled for higher education for the first time in the winter term 2010. For several reasons, the analysis is restricted to university students who initially enrolled for a bachelor's degree course. In particular, the structure of bachelor's degree courses at universities is quite uniform – in 2010, about 95 % of bachelor's degree courses at German universities had a standard study duration of six semesters (Wissenschaftsrat 2010). By contrast, the study duration of other degree types and in degree courses at the universities of applied sciences is more heterogeneous – preventing conclusions on whether students completed their studies in time or not.

In order to be able to reconstruct trajectories over a sufficiently long time span, that is, a period long enough to allow for the majority of students to have completed their studies, this analysis uses a subsample of students who participated in at least one of the latest CATI

waves 10, 12, 13 or 15 covering questions on study progress. Study trajectories are reconstructed up to the month of (first) bachelor's degree completion or up to a time span of five years and five months (October 2010 – February 2016).

The trajectory sequences are cleaned to deal with overlapping enrolment phases and short study interruptions.³ The following enrolment states are considered:

(1) the 'default' state: being enrolled in a bachelor's degree course, completed with a degree;

(2)–(4): being enrolled in a bachelor's degree course but having not (yet) completed with a degree (incremented), that is

(2) a first not (yet) completed study phase in a bachelor's degree course

(3) a second not (yet) completed study phase in a bachelor's degree course

(4) a third (2+) not (yet) completed study phase in a bachelor's degree course⁴;

(5) being enrolled in a degree course that does not lead to a bachelor's degree. This mostly concerns switches into a state examination degree course after initial enrolment in a bachelor's degree course; and

(6) study interruptions.⁵

Note that incomplete study phases – i.e. no degree earned up to the end of the considered time frame – can theoretically still be completed in the future.

Sequence analysis is applied to compare the sequences with each other and to cluster them based on their dissimilarity using the Levenshtein II algorithm, which emphasises the order and occurrence of enrolment states over spell duration (Cornwell 2015).

Six distinct trajectory types are retained using Ward's linkage hierarchical cluster analysis.⁶ The sequence analysis and subsequent visualisation are based on the *SQ* and *SADI* packages for Stata (Brzinsky-Fay et al. 2006; Halpin 2017).

³ Overlapping enrolments, i.e., when a student was simultaneously enrolled in two degree courses, are cleaned according to a priority rule (<2.5 % of all spells). Gaps of less than three months are evenly filled by the prior and latter sequence elements whereas gaps of three months or more are kept as distinct elements, i.e. as study interruptions (using the Stata *adospell*; Kröger 2015).

⁴ In principle, more than three subject switches could occur over the course of a study trajectory. As this incidence is rare, a fourth bachelor study phase (or beyond) is not included as a distinct state, but merged with the '2+ bachelor studies, not completed' state.

⁵ Not all trajectory attributes could be considered in the current approach, such as studying abroad or continuing one's studies at another university. For feasibility reasons, this contribution could not consider all of these attributes.

⁶ The selection of the optimal number of clusters is based on a visual inspection and goodness-of-fit indicators (Calinski-Harabasz index and the Duda-Hart cluster stopping indices, cf. Cornwell 2015; Halpin 2016).

All the displayed descriptive outcomes are weighted and adjusted for the stratified clustered sampling design using Stata's *svy* package. The weights account for observed bias in the initial wave 1 sample (selection probability bias, initial non-response bias) and the panel attrition of later waves (Zinn et al. 2017; see also above).

Operationalisation of social origin

Table 2: Description of covariates.

| Variable | All | By parental education | | | |
|---|-------------------|-----------------------|-------------------|------------------|------------------|
| | | Low | Middle | UAS | Uni |
| Parents: highest level of education | | | | | |
| Low: up to middle sec. school, no VET (CASMIN 1a-2b) | 0.107 | | | | |
| Middle: middle sec. school + VET; upper sec. school (CASMIN 2a, 2c) | 0.410 | | | | |
| University of applied sciences (CASMIN 3a) | 0.091 | | | | |
| University (CASMIN 3b) | 0.392 | | | | |
| Parents: highest ISEI, standardised | | | | | |
| Range: -2.56 (low) – 1.46 (high) | -0.021 (0.027) | -1.101 (0.043) | -0.504 (0.025) | 0.313 (0.039) | 0.717 (0.020) |
| Higher education entrance examination GPA | | | | | |
| Excellent/very good | 0.164 | 0.107 | 0.127 | 0.152 | 0.221 |
| Good | 0.525 | 0.490 | 0.531 | 0.585 | 0.517 |
| Satisfactory/sufficient | 0.312 | 0.403 | 0.342 | 0.263 | 0.262 |
| Parents in favour of higher education: “My parents consider it very important that I study for a degree” (wave 1) | | | | | |
| Does rather apply/applies completely | 0.643 | 0.479 | 0.575 | 0.694 | 0.753 |
| Does not apply at all/does rather not apply/partly applies | 0.357 | 0.521 | 0.426 | 0.306 | 0.247 |
| Parents provided useful information on study decision & planning (wave 2) | | | | | |

| Variable | All | By parental education | | | |
|--|---------|-----------------------|---------|---------|---------|
| | | Low | Middle | UAS | Uni |
| Helpful | 0.552 | 0.379 | 0.455 | 0.624 | 0.677 |
| Not provided/not helpful | 0.448 | 0.621 | 0.545 | 0.376 | 0.323 |
| Cost burden of studying (wave 1) | 2.760 | 2.988 | 2.897 | 2.679 | 2.566 |
| Additive scale of direct and opportunity costs (Cronbach's alpha: 0.69) | (0.022) | (0.064) | (0.027) | (0.052) | (0.021) |
| Range: 1 (no burden at all) – 5 (very high burden) | | | | | |
| Compatibility: studies and other obligations are hard to match (wave 3) | | | | | |
| Does not apply | 0.413 | 0.358 | 0.392 | 0.461 | 0.434 |
| Partly | 0.320 | 0.342 | 0.313 | 0.312 | 0.324 |
| Applies (completely) | 0.267 | 0.300 | 0.295 | 0.228 | 0.242 |
| Gender | | | | | |
| Male | 0.463 | 0.423 | 0.445 | 0.492 | 0.490 |
| Female | 0.537 | 0.577 | 0.555 | 0.509 | 0.510 |
| Migration background | | | | | |
| None | 0.817 | 0.727 | 0.839 | 0.882 | 0.810 |
| 1st generation | 0.037 | 0.036 | 0.030 | 0.024 | 0.046 |
| 2nd generation | 0.146 | 0.237 | 0.132 | 0.094 | 0.144 |

| Variable | All | By parental education | | | |
|---------------------------------------|-------|-----------------------|--------|-------|-------|
| | | Low | Middle | UAS | Uni |
| Major at initial enrolment | | | | | |
| Humanities/cultural studies/languages | 0.308 | 0.320 | 0.310 | 0.300 | 0.302 |
| Business/economics | 0.153 | 0.174 | 0.172 | 0.132 | 0.131 |
| Social sciences | 0.107 | 0.111 | 0.108 | 0.104 | 0.105 |
| Sciences | 0.270 | 0.254 | 0.269 | 0.262 | 0.277 |
| Engineering | 0.163 | 0.141 | 0.142 | 0.203 | 0.185 |

Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

Note: Weighted outcomes. N=4,833. Mean (std. err.) for continuous variables; proportion for categorical variables. UAS = University of applied sciences degree; Uni = University degree.

Table 2 provides an overview of all variables.⁷ Social origin is based on two dimensions: parents' highest level of education, based on the CASMIN scheme and collapsed into four groups, and parents' highest occupational status, based on the International Socio-Economic Index of Occupational Status (ISEI). A distinction of parents' universities of applied sciences vs. university degrees seems appropriate given the differences in regard to status, study content and organization of the two university types decades ago.

Cultural-academic resources are measured based on the higher education entrance examination GPA to approximate academic ability and affinity. Two additional variables measure whether parents facilitate higher education attainment: their attitudes towards the student's enrolment choice and whether the parents are of help regarding higher education enrolment. Economic resources are considered as a summed scale of the perceived financial burden of studying and the difficulty of reconciling higher education with other commitments. Subject at initial enrolment, migration background and gender are included as control variables.

Modelling strategy

Because of the multi-categorical nature of the dependent variable "trajectory type", multinomial logistic regression is applied. Given the correlation between occupational status and education – with education being the most important predictor of occupational status – two separate sets of models are run. For each set of models, average marginal effects will be displayed. A baseline model will show the full effect of social origin, with more explanatory variables added stepwise to the models. Weighted and unweighted relative risk ratios are included in the appendix table A1.

Results

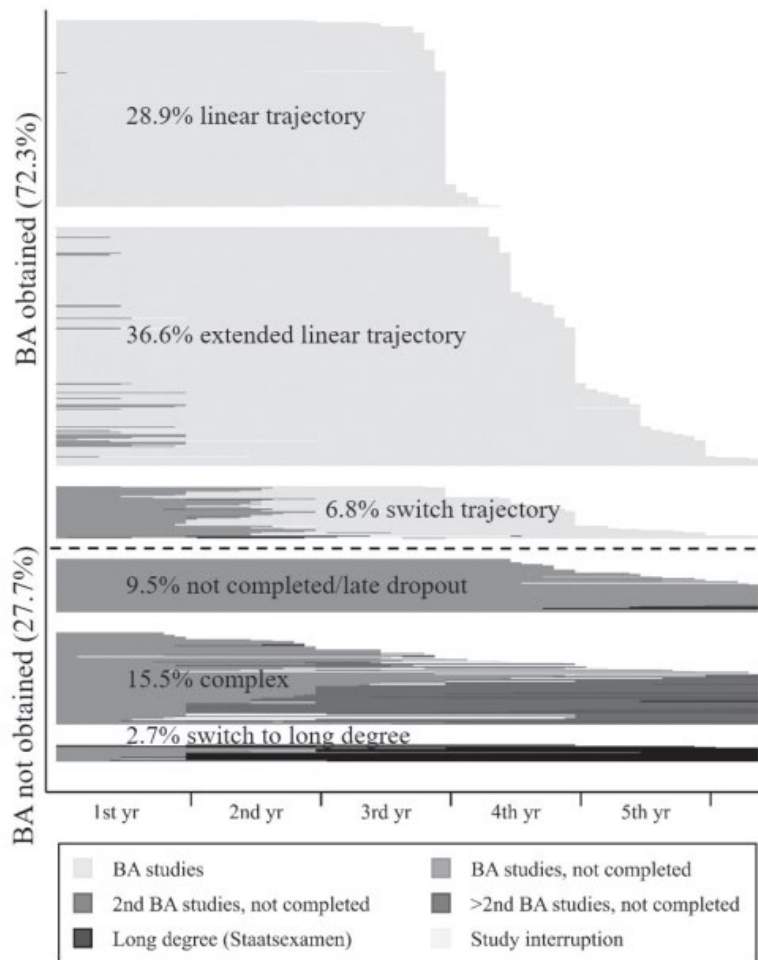
Results of the sequence analysis: Six study trajectory clusters

As shown in Figure 1, the results of the sequence analysis and subsequent clustering retained an optimal solution of six trajectory types. The first three clusters – 72.3 % of all students – resemble each other in that they consist of study trajectories that were successfully completed with a bachelor's degree. Yet, they differ in terms of study duration and by whether students switched study programme or not. To be

⁷ In order to retain as many cases as possible, missing information of ordinal and nominal scaled covariates is included as separate missing value categories.

more specific, clusters 1 and 2 comprise students who followed almost only linear trajectories. These students remained enrolled in the bachelor's degree course in which they initially enrolled in winter 2010 and mostly graduated from this course without any interruptions or subject switches. The study trajectories in these two clusters only differ in terms of duration in that students in the first cluster reached a degree in roughly three years, whereas students in cluster 2 needed around 3.5 years or longer. These two clusters also constitute the largest clusters, with 28.9 % and 36.6 % of all students, respectively. Thus, according to this sample, exceeding the standard study duration is not only very common, it is even more common than graduating within the standard study duration. The third cluster (6.8 %) also comprises completed trajectories, although students did not graduate in the degree course for which they initially enrolled. These students switched their degree course, and, in a small number of cases, they did so more than once. In line with previous findings, course switches occur early, mostly within the first 1.5 years after initial enrolment.

Figure 1: Sequence index plot of six trajectory types.



Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

Note: Based on a random selection of 600 observations.

Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

Note: Based on a random selection of 600 observations.

The other three clusters – 27.7 % of the students in total – comprise students who had not (yet) graduated within the given time window of more than five years. Among them, about 9.5 % of all students either dropped out of their initial degree course at a very late stage or still remained enrolled in this degree course (cluster 4). The largest cluster among the not (yet) completed trajectories constitutes the complex cluster (cluster 5), with 15.5 % of all students. This cluster contains early dropouts, but most students in this cluster exhibit more complicated trajectories, such as having

switched their degree course at least once without graduating (thus far). Often, students in this cluster have also interrupted their studies for a couple of months. The last cluster (cluster 6) comprises 2.7 % of all students. These students also switched courses, but onto a non-bachelor's degree course. In most instances, this means that students switched into a state examination degree course, which is the common degree for subjects such as medicine, law, dentistry and partly also teaching studies.

In sum, study programme switches, and in particular exceeding the standard study duration, are widespread attributes of study trajectories of bachelor's degree students in Germany. By contrast, study interruptions or early dropouts from higher education are less common.

Linking social origin and study trajectories: Results of the multinomial logistic regressions

Table 3 displays the outcomes of multinomial logistic regressions, complemented by a graphic display in the form of the average adjusted predictions presented in Figures 2 and 3.⁸ The first set of models (Table 3a) focuses on parents' education, with university degree defined as reference category. As the baseline model (1) reveals, compared to students with university-educated parents, students whose parents have obtained a low level of education are significantly less likely to follow a linear trajectory (cluster 1). Instead – and controlling for migration background, field of study and gender – they are more likely to engage in not yet completed/late dropout (cluster 4) or complex trajectories (cluster 5). By contrast, there are no significant differences by parents' education in following an extended linear trajectory (cluster 2) and a switch trajectory (cluster 3), and a weak statistically significant negative effect to switch to a long study programme (cluster 6).

⁸ Likelihood ratio tests of the reduced and full model favour the full model over the reduced one.

Table 3a: Results of the multinomial logistic regression models by parents' education (average marginal effects).

| Cluster type | (1) linear | | | (2) extended linear | | | (3) switch | | |
|--|------------|-----------|-----------|---------------------|--------|--------|------------|--------|--------|
| Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Parents' education (ref.: university degree) | | | | | | | | | |
| Low | -0.067** | -0.028 | -0.021 | -0.043 | -0.028 | -0.020 | -0.003 | -0.002 | 0.000 |
| Middle | 0.018 | 0.040** | 0.043** | -0.024 | -0.022 | -0.018 | -0.008 | -0.008 | -0.007 |
| UAS degree | 0.027 | 0.036 | 0.035 | -0.038 | -0.041 | -0.042 | -0.001 | -0.001 | -0.000 |
| GPA school (ref.: excellent/very good) | | | | | | | | | |
| Good | | -0.134*** | -0.133*** | | 0.044* | 0.045* | | 0.005 | 0.005 |
| Satisfactory/sufficient | | -0.248*** | -0.244*** | | -0.027 | -0.022 | | 0.001 | 0.003 |
| Parents' opinion on studies (ref.: rather/not at all/partly important) | | | | | | | | | |
| Rather/completely important | | | -0.006 | | | -0.027 | | | -0.008 |

| Cluster type | (1) linear | | | (2) extended linear | | | (3) switch | | |
|--|------------|-----------|-----------|---------------------|-----------|-----------|------------|--------|--------|
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Parents provided information (ref.: helpful) | | | | | | | | | |
| Not provided/helpful | | | -0.015 | | | -0.002 | | | -0.007 |
| Major (ref.: humanities) | | | | | | | | | |
| Business/economics | 0.019 | 0.037 | 0.037 | 0.021 | 0.016 | 0.016 | -0.021 | -0.022 | -0.022 |
| Social sciences | -0.091*** | -0.082*** | -0.083*** | 0.077** | 0.077** | 0.076** | 0.016 | 0.015 | 0.017 |
| Sciences | 0.074*** | 0.064*** | 0.064*** | -0.059*** | -0.064*** | -0.065*** | -0.011 | -0.011 | -0.011 |
| Engineering | -0.084*** | -0.091*** | -0.092*** | 0.081*** | 0.073** | 0.071** | -0.006 | -0.006 | -0.007 |
| Gender (ref.: male) | | | | | | | | | |
| Female | 0.087*** | 0.073*** | 0.072*** | -0.036* | -0.041** | -0.041** | 0.016 | 0.015 | 0.016 |
| Migration background (ref.: none) | | | | | | | | | |
| 1st generation | -0.145*** | -0.093* | -0.092* | 0.079 | 0.128** | 0.122* | -0.033 | -0.032 | -0.033 |

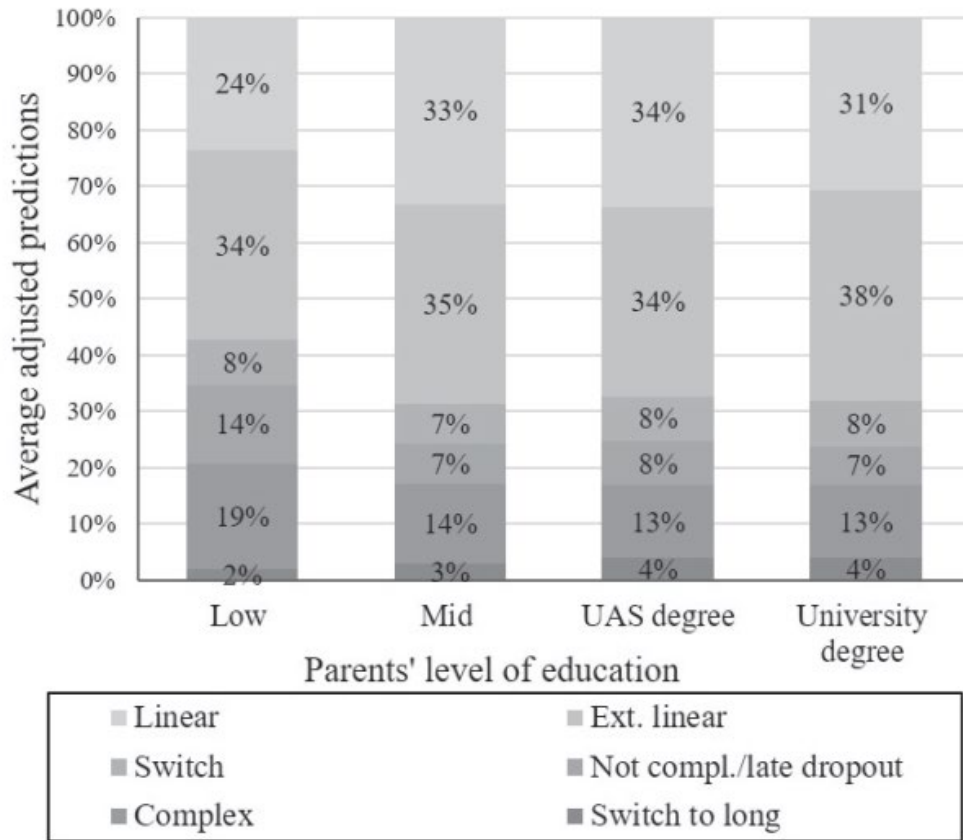
| Cluster type | (1) linear | | | (2) extended linear | | | (3) switch | | |
|----------------|------------|-----------|-----------|---------------------|--------|--------|------------|-------|-------|
| Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 2nd generation | -0.085*** | -0.074*** | -0.072*** | 0.042* | 0.045* | 0.043* | 0.005 | 0.005 | 0.004 |

| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | |
|--|--|----------|----------|-------------|----------|----------|--------------------|---------|---------|
| Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Parents' education (ref.: university degree) | | | | | | | | | |
| Low | 0.072*** | 0.047** | 0.034* | 0.060** | 0.029 | 0.024 | -0.018* | -0.017* | -0.017* |
| Middle | 0.008 | 0.001 | -0.006 | 0.017 | 0.001 | -0.000 | -0.011* | -0.012* | -0.011 |
| UAS degree | 0.012 | 0.011 | 0.011 | 0.002 | -0.003 | -0.003 | -0.001 | -0.002 | -0.001 |
| GPA school (ref.: excellent/very good) | | | | | | | | | |
| Good | | 0.022** | 0.020* | | 0.052*** | 0.052*** | | 0.011 | 0.010 |
| Satisfactory/sufficient | | 0.084*** | 0.080*** | | 0.189*** | 0.183*** | | 0.001 | 0.000 |

| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | | |
|--|--|-----------|-----------|-------------|---------|---------|--------------------|--------|--------|--------|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Parents' opinion on studies (ref.: rather/not at all/partly important) | | | | | | | | | | |
| Rather/completely important | | | | 0.029** | | | 0.014 | | | -0.002 |
| Parents provided information (ref.: helpful) | | | | | | | | | | |
| Not provided/helpful | | | | 0.021* | | | 0.003 | | | 0.001 |
| Major (ref.: humanities) | | | | | | | | | | |
| Business/economics | 0.009 | 0.006 | 0.005 | -0.018 | -0.026 | -0.025 | -0.011 | -0.011 | -0.011 | -0.011 |
| Social sciences | 0.004 | 0.003 | 0.001 | -0.017 | -0.023 | -0.022 | 0.010 | 0.010 | 0.010 | 0.011 |
| Sciences | -0.018 | -0.013 | -0.012 | -0.002 | 0.008 | 0.008 | 0.017* | 0.016* | 0.016* | 0.016* |
| Engineering | 0.020 | 0.028* | 0.030* | -0.009 | -0.000 | 0.001 | -0.003 | -0.004 | -0.004 | -0.003 |
| Gender (ref.: male) | | | | | | | | | | |
| Female | -0.041*** | -0.035*** | -0.035*** | -0.035** | -0.022* | -0.023* | 0.010* | 0.009 | 0.009 | 0.010* |

| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | | |
|-----------------------------------|--|-------|-------|-------------|--------|--------|--------------------|---------|---------|---|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Migration background (ref.: none) | | | | | | | | | | |
| 1st generation | 0.100** | 0.035 | 0.042 | 0.013 | -0.028 | -0.027 | -0.014 | -0.010 | -0.011 | |
| 2nd generation | 0.022 | 0.019 | 0.021 | 0.029 | 0.018 | 0.017 | -0.013* | -0.013* | -0.014* | |

Figure 2: Average adjusted predictions of six trajectory types by parental education.



Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

Note: Based on model 1. N = 4,833.

Differentiating again by degree completion or not (i.e. comparing clusters 1–3 to clusters 4–6), the average adjusted predictions in Figure 2 depict that 66 % of students whose parents have obtained a low level of education complete a bachelor’s degree in the time window of more than five years, while this is the case for 75 % of students whose parents have an intermediate level of education and 76 % of students whose parents have obtained a university or university of applied sciences degree.

In models 2 and 3, academic-cultural resource variables are added to test whether they explain the social origin effect (GPA, parents’ opinion on higher education attainment, provision of relevant information). Academic achievement has a major impact, particularly with regard to following a linear trajectory (cluster 1), a not yet completed/late dropout trajectory (cluster 4) or a complex trajectory (cluster 5). For example, regarding linear trajectories (cluster 1), the average marginal effect for students with satisfactory or sufficient GPAs compared to those with excellent or very good GPAs is 24.8. Comparing model 1 and 2 also reveals that the effect of parental education can be partly explained with achievement, as the effects become insignificant and smaller. However, a weak(er) significant effect

remains in regard to low parental education for cluster 4 and cluster 6. After controlling for GPA, there appears a significant positive effect for parents' middle level of education on following a linear trajectory (cluster 1). By contrast, parents' opinion and provision of information does not add much in explaining the effect of parental education. Yet, students who indicate that their parents find higher education important are more likely to follow a not yet completed/late dropout trajectory (cluster 4) compared to their fellow students whose parents do not value higher education. Also, if parents provide useful information, students are less likely to engage in cluster 4.

Table 3b: Results of the multinomial logistic regression models by parents' occupational status (average marginal effects).

| Cluster type | (1) linear | | | (2) extended linear | | | (3) switch | | | |
|--|------------|-----------|-----------|---------------------|---------|---------|------------|--------|--------|--------|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Occupational status | | 0.012 | -0.001 | -0.000 | 0.016* | 0.014* | 0.014* | 0.003 | 0.003 | 0.003 |
| GPA school (ref.: excellent/very good) | | | | | | | | | | |
| Good | | | -0.132*** | -0.129*** | | 0.044* | 0.045* | | 0.005 | 0.006 |
| Satisfactory/sufficient | | | -0.247*** | -0.239*** | | -0.026 | -0.019 | | 0.002 | 0.005 |
| Cost burden | | | | 0.005 | | | 0.000 | | | -0.001 |
| Compatibility (ref.: does not apply) | | | | | | | | | | |
| Partly | | | | 0.012 | | | -0.022 | | | -0.003 |
| Completely | | | | 0.006 | | | -0.057** | | | -0.001 |
| Major (ref.: humanities) | | | | | | | | | | |
| Business/economics | | 0.020 | 0.038 | 0.038 | 0.022 | 0.017 | 0.019 | -0.021 | -0.022 | -0.021 |
| Social sciences | | -0.092*** | -0.084*** | -0.083*** | 0.076** | 0.076** | 0.077** | 0.016 | 0.016 | 0.016 |

| Cluster type | (1) linear | | | (2) extended linear | | | (3) switch | | | |
|-----------------------------------|------------|-----------|-----------|---------------------|----------|-----------|------------|--------|--------|--------|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Sciences | | 0.075*** | 0.064*** | 0.063*** | -0.057** | -0.062*** | -0.057** | -0.011 | -0.011 | -0.011 |
| Engineering | | -0.082*** | -0.091*** | -0.093*** | 0.083*** | 0.075** | 0.079** | -0.006 | -0.006 | -0.007 |
| Gender (ref.: male) | | | | | | | | | | |
| Female | | 0.088*** | 0.074*** | 0.075*** | -0.036* | -0.041** | -0.038* | 0.016 | 0.016 | 0.016 |
| Migration background (ref.: none) | | | | | | | | | | |
| 1st generation | | -0.147*** | -0.097* | -0.103* | 0.085 | 0.133** | 0.129** | -0.031 | -0.030 | -0.032 |
| 2nd generation | | -0.086*** | -0.078*** | -0.078*** | 0.050* | 0.053* | 0.055* | 0.006 | 0.006 | 0.006 |

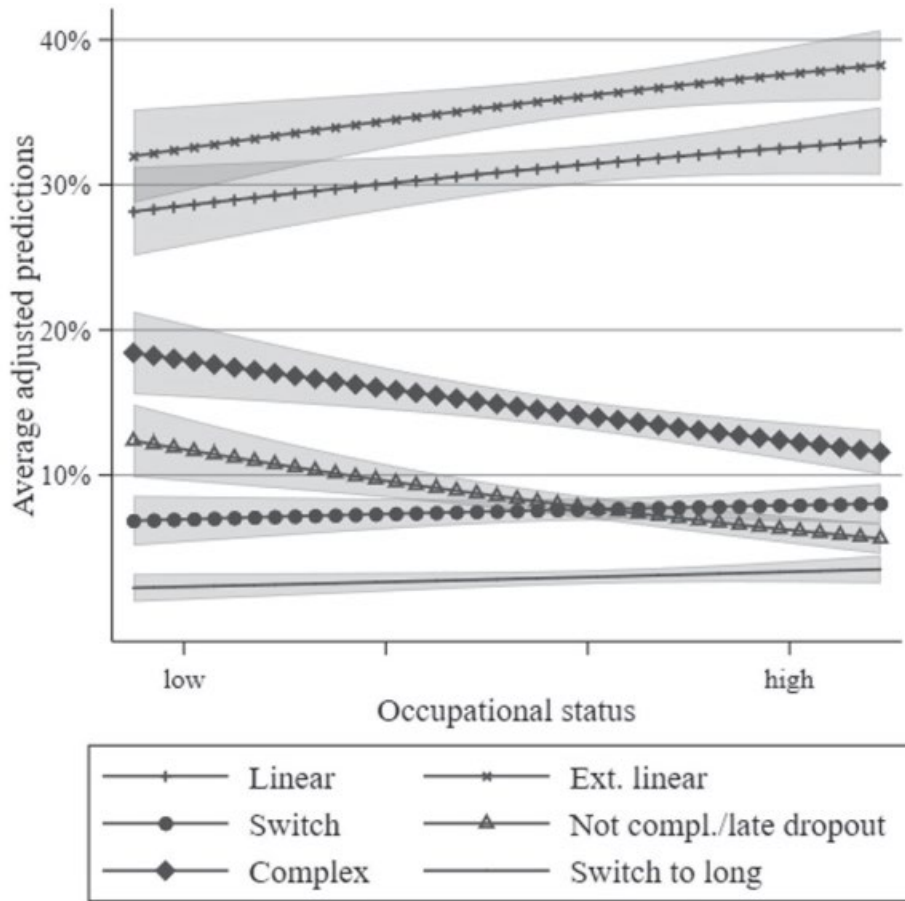
| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | | |
|---------------------|--|-----------|----------|-------------|-----------|--------|--------------------|-------|-------|-------|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Occupational status | | -0.017*** | -0.011** | -0.012** | -0.018*** | -0.008 | -0.007 | 0.004 | 0.003 | 0.003 |

| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | | |
|--|--|----------|----------|-------------|----------|----------|--------------------|--------|--------|--------|
| | Model | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| GPA school (ref.: excellent/very good) | | | | | | | | | | |
| Good | | 0.021* | 0.021* | | 0.051*** | 0.047*** | | 0.010 | 0.010 | |
| Satisfactory/sufficient | | 0.083*** | 0.084*** | | 0.188*** | 0.170*** | | -0.000 | -0.001 | |
| Cost burden | | | -0.011* | | | 0.009 | | | | -0.002 |
| Compatibility (ref.: does not apply) | | | | | | | | | | |
| Partly | | | 0.005 | | | 0.007 | | | | 0.002 |
| Completely | | | 0.024* | | | 0.021 | | | | 0.007 |
| Major (ref.: humanities) | | | | | | | | | | |
| Business/Economics | 0.008 | 0.005 | 0.003 | -0.019 | -0.026 | -0.027 | -0.011 | -0.012 | -0.012 | |
| Social sciences | 0.007 | 0.004 | 0.005 | -0.015 | -0.022 | -0.025 | 0.010 | 0.010 | 0.010 | |
| Sciences | -0.020* | -0.014 | -0.016 | -0.004 | 0.007 | 0.007 | 0.017* | 0.015* | 0.015* | |

| Cluster type | (4) not yet completed/ late dropout | | | (5) complex | | | (6) switch to long | | |
|-----------------------------------|--|-----------|-----------|-------------|---------|----------|--------------------|---------|---------|
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Engineering | 0.018 | 0.027 | 0.023 | -0.011 | -0.002 | 0.003 | -0.002 | -0.003 | -0.004 |
| Gender (ref.: male) | | | | | | | | | |
| Female | -0.042*** | -0.035*** | -0.034*** | -0.036** | -0.023* | -0.029** | 0.010 | 0.009 | 0.009 |
| Migration background (ref.: none) | | | | | | | | | |
| 1st generation | 0.097** | 0.032 | 0.031 | 0.011 | -0.028 | -0.016 | -0.014 | -0.009 | -0.010 |
| 2nd generation | 0.019 | 0.017 | 0.017 | 0.025 | 0.016 | 0.014 | -0.014* | -0.013* | -0.013* |

Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0. Note: ref.= reference category.* p<.05, ** p<.01 *** for p<.001. N=4,833. For relative risk ratios see appendix.

Figure 1: Average adjusted predictions of six trajectory types by parents' occupational status.



Source: NEPS Starting Cohort 5 – First-Year Students, doi:10.5157/NEPS:SC5:15.0.0.

Note: Based on model 1. N = 4,833.

Table 3b includes the results for parents' occupational status. These are based on a similar modelling strategy: the first model depicts the full occupational status effect while the subsequent models 2 and 3 add GPA and two more explanatory variables related to economic resources. Model 1 reveals that the occupational status of the parents affects a student's likelihood to engage in one of the two discontinuous trajectory types (cluster 4 and 5): an increase of one standard deviation on the occupational status scale decreases the likelihood to engage in a study trajectory type cluster 4 or 5 by about 2 percent. While these effects turn smaller and insignificant in regard to cluster 5, these effects remain somewhat stable after adding more explanatory variables in the case of cluster 4. That is, the given measures of economic resources cannot yet account for these social origin effects. Students who indicate that they find it difficult to manage studying and undertaking other duties are less likely to follow an extended linear trajectory (cluster 2) and more likely to follow a not yet completed/late dropout trajectory (cluster 4), although this effect is only weakly statistically

significant. Furthermore, a higher perceived cost burden of studying is also related to a lower likelihood of engaging in a cluster 4-type trajectory, but this effect is also only weakly statistically significant.

What do these findings mean with regard to the hypotheses? Overall, these findings are more in line with the first hypotheses, suggesting that students who can benefit from their parents' economic and academic-cultural resources are more likely to follow a linear study trajectory. Compared to students of advantaged background, students of low social origin are less likely to engage in a linear trajectory, but instead more likely to engage in the discontinuous trajectory types 4 and 5. Another notable finding is that there are almost no other significant differences by other levels of parental education (i.e., middle and university of applied sciences). Thus, contrary to expectations, it seems that parents' own university experience is not a decisive factor.

Conclusion

Given the knowledge gap on study patterns through German higher education, this article aims to shed light on the relationship between students' social origin and their study trajectories after first-time enrolment for a bachelor's degree at German universities. Sequence analysis followed by cluster analysis was employed to reconstruct these trajectories.

Two social origin dimensions were considered: parental education and occupational status. It was hypothesised that the former provides the necessary cultural resources, whereas the latter allocates economic resources, thereby enabling a linear study trajectory. On the contrary, it also seemed plausible that relying on parents' cultural and economic resources enables students to deviate intentionally from standard study trajectories.

The reconstruction of these trajectories reveals that exceeding the standard duration of study (even without switching the degree course) and switching one's degree course are common attributes. By contrast, study interruptions are less widespread. This is plausible given the inflexible study offer at German universities which does not yet cater well to the needs of part-time students. Besides, this also shows that study trajectories are not as varied and unstandardized as in other higher education contexts where highly individualized study trajectories, including study interruptions, university transfers and course switches, have become common practice.

The major finding of this study is that a low social origin increases the risk of following non-linear study trajectories, including dropouts, postponing degree completion for over more than five years and engaging in other complex study trajectories. To be more specific, particularly students of low educated parents are at risk, while no significant differences in the study trajectories of students from other educational backgrounds in comparison to university educated parents could be detected. These effects are strongly connected to differences in academic achievement, but they can also be attributed to some extent to the allocation of other cultural resources. In principal, this is in line with earlier studies –

confirming a social origin effect in dropout – and goes beyond, by pointing to a social origin effect in their actual trajectories.

These findings are remarkable in light of the early ability sorting and low permeability within the German education system. As university students have “survived” previous achievement-based sorting and have not opted for alternative educational pathways, university students may display homogeneity in terms of their ability, motivation and determination.

There are some limitations to the investigation of study trajectories employed here. While sequence analysis has become increasingly popular in other areas of sociological and demographic research, it has seldom been applied to investigate the complexity of educational pathways. This is surprising given that it enables an analysis of trajectories beyond singular events. The student cohort of the NEPS is particularly well suited for such an intent. However, panel attrition is a major threat to the quality of all panel data, including the data set utilised here. Thus, this raises a question about the external validity of the results, as it remains unknown whether and to what extent the complexity of study trajectories is underestimated. Because of the lack of unequivocal baseline data from which comparisons could be made, validating the findings is not straightforward. The official completion rates published by the Federal Statistical Office and the dropout rates provided by the German Centre for Higher Education Research and Science Studies differ in their methodology, leading to a constant disparity of about 10 % (Statistisches Bundesamt 2020a). For the cohort in question – students who enrolled in the academic year 2010 – the dropout rate was 32 % (Heublein et al. 2020) whereas the completion rate amounted to 78 % (Statistisches Bundesamt 2020a). In the current study, about 72 % completed a bachelor’s degree within five years. Assuming that some of the students would have completed their studies after the observation window, this is not too far off the official completion quote provided by the federal statistical office.⁹

Furthermore, only one student cohort has been surveyed so far. This was in 2010, at a time when the implementation of the European higher education area reforms was still in full swing at many universities, impeding generalizations beyond this cohort. In particular, this study finds that more students exceed the standard study duration than students completing their degrees in time. It cannot be ruled out that this is a result of the early stage implementation of the Bologna reforms. Many of the survey participants could have belonged to the first or second cohort of bachelor’s degree courses, and perhaps experienced ambiguous or complicated study instructions and structures. However, the median study duration of bachelor graduates actually grew over time, suggesting that this does not hold (Autorengruppe Bildungsberichterstattung 2018). At a broader level, this also raises the question of whether the reforms actually fulfilled their objectives in terms of reducing long study durations and preventing late dropouts.

⁹ One should also note that this quote encompasses graduates from the universities of applied sciences, which usually have slightly higher completion rates.

A range of questions remain for future research. While the dataset used here is particularly rich to study educational trajectories, the operationalisation of the proposed mechanisms and concepts should serve as proxies rather than ideal operationalisations of the theoretical concepts. In particular, the strong effect of students' school leaving certificate GPA deserves to be further investigated. It has been argued that it not only reflects academic ability, but also implicates affinity with and proximity to (higher) education. Separating ability from acquired behaviour to fulfil the requirements that the education system poses remains a challenge.

This study concentrated solely on university students in bachelor degree courses. In terms of extending this research, certainly relevant is also a focus on students in other degree courses, particularly in master programmes. While it could be expected that the study trajectories of these students are overall more linear, given that reorientations occur less frequently, it remains an open question whether and how this interacts with social origin. Furthermore, in light of institutional differentiation, investigating to what extent study trajectories differ across universities or specific university types – such as universities benefitting from the excellence initiative – is likewise vital. Ultimately, given the expected path dependencies and age norm effects, future research should also consider students' pre-tertiary pathways.

As a concluding remark, this study has shown that dropout and completion rates are oversimplified indicators of students' higher education outcomes. The application of sequence analysis on study trajectories has proved to be feasible in this regard. Future research needs to improve on the operationalisation of the mechanisms explaining students' trajectories through higher education. In this vein, further investigation is particularly needed with regards to the actual role of academic ability and its effects on students' trajectories.

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