Citizenship and education trajectories among children of immigrants: A transition-oriented sequence analysis

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ABSTRACT

During recent decades, the educational outcomes of the children of immigrants have been extensively studied, with a growing emphasis on the heterogeneity of the so-called second generation. Yet, the impact of host country citizenship on children's educational outcomes has only received limited attention so far, although children of immigrants do not get automatic birthright citizenship in most European countries. Focusing on the Netherlands, this paper compares educational trajectories among citizen and non-citizen children of immigrants. Register data and sequence analysis are used to map and cluster the trajectories of a full cohort of second-generation students from the start of secondary school. We apply a variant of optimal matching focusing on sequences of transitions, which enables us to uncover different patterns of (im)mobility within a stratified school system better than the standard approach. Multinomial logistic regressions show that students who acquire Dutch citizenship are significantly more likely to follow upward trajectories, taking advantage of the system's flexibility and "back doors". Conversely, not having Dutch citizenship is associated with a higher risk of dropout and school interruptions. These findings are in line with our theoretical expectation that, during the naturalisation process, parents acquire or further develop important resources for navigating a complex educational system such as the Dutch one.

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1. Introduction

Second-generation children, those born in the country to which their parents migrated, now represent a growing and sizeable population in Western societies. Although there is substantial variation in the way these children perform in education across destination countries, extensive evidence suggests that children of immigrants experience disadvantages with respect to their native counterparts in Europe (e.g. Dustmann, Tommaso, & Gianandrea, 2012; Heath, Rothon, & Kilpi, 2008). Recently, some literature has shown that one element that may help children of immigrants to overcome some of these obstacles is their access to host country citizenship (Felfe, Rainer, & Saurer, 2020).

In two out of three countries in the world, the children of immigrants do not have rights to the citizenship of their country of birth. They instead rely on their parents' ability and desire to naturalise if they are to acquire the citizenship of their country of birth and residence (Honohan & Rougier, 2018, p. 355). European countries are no exception: most of them combine *ius sanguinis* citizenship regimes with varying conditional *ius soli* provisions. At the same time, naturalisation requirements have become increasingly strict in Europe (Vink & de Groot, 2010). This makes it all the more important to understand whether and how legal status affects children of immigrants' life conditions in general and their educational achievement in particular.

While interest in the citizenship of the second generation is not new (Bolzman, Rosita, & Marie, 2003; Colombo, Domaneschi, & Marchetti, 2011; Frauenfelder, 2007), only a few quantitative studies do analyse educational outcomes in relation to citizenship (Bean, Leach, Brown, Bachmeier, & Hipp, 2011; Cygan-Rehm, 2018; Felfe et al., 2020; Fibbi, Lerch, & Wanner, 2007; Kilpi-Jakonen, 2014). Overall, these studies suggest citizenship has a positive impact on various indicators of

educational achievement. However, previous literature tends to focus on isolated educational transitions or outcomes, which neglects how students negotiate their way through a given school system (Boylan, 2020; Goldrick-Rab, 2016). We argue that the effect of citizenship needs to be assessed more comprehensively. From a life course perspective (Elder, 1974), naturalisation can be seen as a process affecting the opportunities and constraints of immigrant families in host societies, which increases their level of agency and their capacities to navigate complex institutions (Patler, Gleeson, & Schonlau, 2020; Wingens, Windzio, Valk, & Aybek, 2011). We shed light on the resources and skills parents may acquire during and following the naturalisation process, further equipping them to assist their children's school careers in a foreign education system. Such resources are particularly crucial in early-tracking and stratified school systems, where immigrant parents may face various obstacles in efficiently guiding their children (Dustmann et al., 2012; Pfeffer, 2008).

Following this life course perspective, we take a dynamic approach to educational attainment to get a more comprehensive insight into the educational trajectories of immigrants' children. We map children of immigrants' educational trajectories using sequence analysis to offer a multidimensional and context-specific indicator of educational attainment. This paper contributes to previous analyses of educational careers using optimal matching (Baysu & de Valk, 2012; Boylan, 2020; Cayouette-Remblière & Saint-Pol, 2013) and applies the transition-oriented optimal matching method introduced by Biemann (2011) to better capture the mobility patterns of students in stratified school systems.

While children of immigrants are often compared with those of native-born residents, we analyse educational trajectories among citizen and non-citizen children of immigrants only. Without diminishing the analytical value of the majority/minority dichotomy (Lessard-Phillips, Galandini, de Valk, & Fibbi, 2017, p. 40), we argue that analysing legal status contributes to shifting the focus towards the hitherto under-explored heterogeneity *within* the second-generation category (Chimienti, Bloch, Ossipow, & de Wenden, 2019). We focus on children of immigrants born in the Netherlands, a country that is representative of the *ius sanguinis* citizenship tradition in Europe. We expect citizenship to be especially relevant in complex school systems such as the Dutch one, where information and strategic knowledge are key to move up the education ladder (Forster & van de Werfhorst, 2019).

We follow a full cohort of second-generation students from their first enrolment in secondary education in 2008 until 2016, using central population registers from Statistics Netherlands. Their school trajectories are mapped as sequences of educational transitions and compared by computing a transition-oriented optimal matching distance (Biemann, 2011). School trajectories are then clustered into predominant educational paths using the partitioning around medoids algorithm. Finally, we carry out multinomial logistic regressions to better understand how naturalisation, among other individual and parental characteristics, is related to specific clusters of educational trajectories.

2. Conceptualising the effect of citizenship within the life course of the children of immigrants

2.1. The benefits of host country citizenship for immigrants and their children

Becoming a citizen of one's country of residence confers a number of rights and benefits. Along with the rights to vote in national elections and to join the armed forces, citizenship opens the doors to various high-ranking positions in the law and public sectors and facilitates access to occupations requiring transnational mobility. More broadly, a host country passport allows for considerable international mobility, which is especially valuable for citizens of non-EU countries.

Previous work has put particular emphasis on the expected labour market benefits of host country citizenship for first-generation

immigrants (e.g. Gathmann & Keller, 2018). That immigrants' host country citizenship may also affect their children's opportunities is less often considered, although the benefits of citizenship are arguably higher for children than for parents (Avitabile, Clots-Figueras, & Masella, 2013, p. 784). When they enter the labour market, the children of immigrants can reap higher and more long-term rewards for skills they have acquired than their parents, who are at a later stage in their careers. Children who are born and educated in the host country are also likely to value the full rights of social and political participation that citizenship brings (Colombo et al., 2011; Frauenfelder, 2007), while their parents may maintain stronger ties with their origin country.

Despite the potential effect of citizenship on the opportunities and well-being of the children of immigrants, the legal status of the second generation has received less attention, in line with the prevalent individual- and adult-centred perspective in citizenship studies (Cohen, 2005; Street, 2014). By contrast, the life course perspective points to the interdependence of individual lives and their embedding within a particular social and institutional context (Wingens et al., 2011). As Peters, Vink, and Schmeets (2016) argue, "(…) the relevance and potential impact of citizenship is bound in a mutually shared context with others" (p. 361), such as one's partner or children. While there is growing evidence that intra-family dynamics are involved in immigrants' naturalisation decisions (Labussière & Vink, 2020; Soehl, Waldinger, & Luthra, 2018; Street, 2014), the effect of such decisions on family members has been unexplored so far, both conceptually and empirically. Yet, as we elaborate below, the notion of linked lives seems crucial to identify the mechanisms through which citizenship may affect children's educational outcomes.

2.2. Education and citizenship of the children of immigrants

A few studies have analysed the effect of citizenship on the educational opportunities of the children of immigrants. Overall, citizenship is found to be positively associated with a range of outcomes, from pre-school enrolment (Felfe et al., 2020) and time spent in schooling (Bean et al., 2011) to academic (vs. vocational) orientation (Cygan-Rehm, 2018; Felfe et al., 2020; Kilpi-Jakonen, 2014) and enrolment in tertiary education (Fibbi et al., 2007). The main theoretical argument that has been developed so far to explain this "citizenship advantage" (Patler, 2017) in education stems from the human capital theory. A number of authors conceptualise the effect of birthright citizenship as a positive shock to the long-term rate of return on investments in children's human capital (Avitabile, Clots-Figueras, & Masella, 2014; Cygan-Rehm, 2018; Felfe et al., 2020). This, in turn, incentivises parents to make early investments in their children's education, such as to have them participate to non-compulsory pre-school (Felfe et al., 2020). In line with this argument, children who automatically get host country citizenship at birth are found to have better behavioural, socio-emotional and health outcomes in the short run compared to those who do not (Avitabile et al., 2014; Felfe et al., 2020).

While it is plausible that host country citizenship incentivises immigrant parents to offer greater educational opportunities to their children, the way they succeed in doing so remain unclear. Immigrant parents may face multiple obstacles in making informed investments in a foreign educational context. Their investments may be constrained by a number of factors, such as poor language competence, lack of interaction with school personnel or difficulties transferring their own educational experience and country-specific knowledge to a new context (Van de Werfhorst & Van Tubergen, 2007). As a result, immigrant parents' level of agency may substantially decrease after migration (Wingens et al., 2011), undermining their ability to efficiently guide their children through the education system. Such ability is particularly crucial in countries where education is hierarchically structured, as students may need to deviate from established pathways to correct initial misplacement (Crul, Schneider, Keskiner, & Lelie, 2017).

Because of these barriers, parents' higher aspirations for their

children may not always translate into greater educational opportunities. Yet, if we look at naturalisation from a life course perspective, there are reasons to think that host country citizenship does not only increase immigrant families' expectations: it may also give them additional resources to fulfil their aspirations.

2.3. Toward a comprehensive theoretical framework

Following the idea that "citizenship acquisition is not an abrupt legal status transition, but rather a process" (Peters, Vink, & Schmeets, 2017, p. 6), we propose to conceptualise the effect of naturalisation more comprehensively. Just as the decision to become a citizen is socially embedded (Labussière & Vink, 2020; Soehl et al., 2018; Street, 2014), its impact may ripple through immigrants' broader social networks, starting with their family. Based on the literature, we can identify three main mechanisms through which naturalisation may affect children of immigrants' educational outcomes.

First, citizenship may benefit children because their parents gain an increased orientation toward the host country as a result of naturalisation. A substantial body of literature has highlighted the "citizenship premium" naturalised immigrants experience in the labour market (e.g. Gathmann & Keller, 2018; Peters et al., 2017; Steinhardt, 2012). Yet, citizenship not only enhances immigrant families' financial and employment stability, there is also evidence that naturalisation acts as a "catalyst" that promotes the social and political integration of immigrants. Naturalisation might indeed not only provide immigrants with greater opportunities, but also shift their time horizon and affect the way they feel perceived, or are perceived, by natives. As Hainmueller, Hangartner, and Pietrantuono (2017) show for the Swiss case, naturalised citizens are more likely to interact with the local community or to follow the country's news. Altogether, naturalisation may increase the economic and sociocultural resources available to children and foster parents' ability to provide advice through better acquaintance with the host country and its language.

Second, parents may acquire or further develop relevant skills for their children's educational success during the naturalisation process itself. Before becoming citizens, immigrant parents have to go through complex procedures that require at least basic language proficiency and some familiarity with the host country institutions (Goodman, 2010; Patler et al., 2020). The naturalisation process thus incentivises parents to make additional investments in their human capital, notably to acquire language and country-specific skills (Peters et al., 2017). This development of human capital during – and in response to – the naturalisation process is likely to have positive implications for their children's educational outcomes.

Finally, while the children of immigrants are expected to indirectly benefit from their parents' enhanced skills and resources, they may also be directly impacted by the acquisition of host country citizenship. Becoming a citizen confers them with the same formal rights as natives, and has many implications for their current and future life. Qualitative work has highlighted the relevance of the formal dimension of citizenship for second-generation youth in *ius sanguinis* regimes (Colombo et al., 2011; Frauenfelder, 2007, pp. 337–340), with young people perceiving citizenship as a protection from legal precariousness and a condition for full and effective participation. Children who feel more included in the host society are likely to have higher levels of motivation.

We would not expect these three mechanisms to play out uniformly, as the relevance and meaning of citizenship may vary across the life course. Previous research shows that the timing of naturalisation matters: the earlier immigrants are eligible to apply for citizenship, the more relevant citizenship is for their socioeconomic integration (e.g. Gathmann & Keller, 2018; Hainmueller et al., 2017; Peters et al., 2017). It is reasonable to expect a similar effect for children, as early acquisition of host country citizenship would limit legal uncertainty and possible feelings of exclusion (Colombo et al., 2011). In that sense, citizenship

might have a stronger effect when it is acquired at birth than at a later point in life.

These theoretical considerations suggest that citizenship may have far-reaching consequences for children's aspirations and opportunities, notably through positive spillover effects from parents' increased orientation towards the host society. However, it is important to note at this stage that an alternative mechanism may be selection: parents acquiring host country citizenship have been shown to be positively selected for education, income and country-specific skills (Hainmueller et al., 2018; Jensen, Mouritsen, Bech, & Olsen, 2019; Peters et al., 2016), which are also commonly associated with children's educational attainment (e.g. Bernardi & Triventi, 2020). While a few studies are able to identify a causal effect for citizenship (Avitabile et al., 2014; Cygan-Rehm, 2018; Felfe et al., 2020), the exploratory approach chosen in this paper is not adequate to disentangle the mechanisms at play.

3. The Dutch context and our hypotheses

3.1. Becoming a Dutch citizen

The Netherlands is representative of most European countries with its *ius sanguinis* citizenship tradition (Honohan & Rougier, 2018). Children of immigrants automatically receive Dutch citizenship by descent if at least one of their parents has naturalised before their birth. Otherwise, they may be included in the naturalisation procedure of (one of) their parents while minors, or apply for citizenship autonomously from the age of majority.[3] A noteworthy aspect, which distinguishes the Netherlands from other countries, is that children of immigrants are not required to renounce their existing nationality, regardless of the procedure under which Dutch citizenship is granted. This may remove an obstacle for parents who want their children to maintain a formal citizenship link with their country of origin. Nevertheless, in such a citizenship regime, second-generation children's citizenship largely depends on parents' desire and ability to naturalise in the first place (Labussière & Vink, 2020).

To become Dutch citizens through naturalisation, foreign citizens need to meet a number of conditions. Importantly, in contrast with their children, first-generation immigrants "must be willing to renounce" their existing citizenship to be eligible for Dutch naturalisation. Beyond its emotional and psychological cost, the renunciation requirement is likely to deprive immigrants of a number of rights in their home countries (Francesca Mazzolari, 2009, p. 173). Other eligibility criteria include a minimum length of legal residence of five years (three years if married to a Dutch citizen) and a clean criminal record in the five years preceding the application. Moreover, prospective citizens need to complete a civic integration test, and demonstrate language proficiency in written and oral expression/comprehension (CEFR level A2). For the civic integration test, candidates have to prepare a "knowledge of Dutch society" component on their own, with limited teaching materials available (Van Oers, 2013, pp. 60–64). The introduction of a formal civic integration test in 2003 substantially raised the overall cost of the naturalisation procedure, as candidates have to pay the costs of both the examination and the courses they often need to take.

3.2. Going through the Dutch education system

Research has shown that the educational context influences children's educational achievement (Baysu & de Valk, 2012; Crul, 2015;

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[3] Note that there is an additional procedure for those born in the Netherlands to foreign citizens: at the age of 18, second-generation youth can acquire Dutch citizenship through "option statement" if they have been living in the Netherlands since birth. Although this procedure is simpler, faster and less costly than the standard naturalisation process, relatively few individuals make use of it (see Labussière & Vink, 2020, p. 2746).

Dicks, Dronkers, & Levels, 2019; Heath et al., 2008) and mediates the relationship between parental resources and their children's educational success (Bol, Witschge, Van de Werfhorst, & Dronkers, 2014; Van de Werfhorst, 2019). In the Dutch school system, obstacles arise less from the financial cost of education (which is mostly free) than from the complexity of its institutional arrangements (Crul, 2018). It is characterised by a full-curriculum tracking system, where students are placed at an early stage – around age 12 – into a specific track for all subjects. Each track offers students unequal opportunities to access higher education and to move upward through the system (see Fig. 1): the pre-university track (VWO) and the general track (HAVO) prepare students for a research university (WO) or a university of applied science (HBO) respectively, while the vocational track (VMBO) prepares them for four different levels of senior vocational education (MBO). Track placement is primarily based on a standardised test at the end of primary school, yet research has shown that parental resources shape students' trajectories, with children of highly-educated parents being more likely to be enrolled in a track above the one corresponding to their test scores (Inspectie van het Onderwijs, 2016; Timmermans, de Boer, Amsing, & van der Werf, 2018).

This stratified system comes with a certain degree of flexibility and fluidity. Notably, being enrolled in a given track does not prevent students from moving upward or downward at a later point, a number of "back doors" being provided for that purpose. Moreover, the hierarchy between the three main tracks is mitigated by the high value placed on vocational education, which, in addition, leads to valuable labour market prospects (Inspectie van het Onderwijs, 2016, p. 18). Yet, students are not equally likely to move between tracks, especially upward. First, families need quality information to navigate this complex system and to choose tracks with good upstream possibilities (Crul, 2018; Forster & van de Werfhorst, 2019, p. 8). For example, students can only go from vocational (VMBO) to general education (HAVO) if they have completed the theoretical track within VMBO (*theoretische leerweg*). Moreover, upward mobility often comes at the price of additional years of schooling. Accessing vocational college (HBO) from a track other than the general or pre-university tracks (HAVO and VWO) requires three additional years of schooling, which may act as an obstacle for a number of students and families (Crul, 2015, p. 334).

Another specificity of the Dutch system is that not all schools offer the same types of education. Although broad school communities exist, education is largely segregated, even within those broader communities. While some schools offer all tracks from vocational to pre-university education, some only cater for the intermediate (e.g. VMBO/HAVO) or highest levels (e.g. HAVO/VWO). Schools also provide different opportunities to attend bridge classes (*brugklas*), in which students follow a combination of levels before choosing a final track. The combinations of levels vary greatly across schools, as well as the length of bridge classes, which can last from one to three years. As a result, "not only must parents know about tracking decisions; they must also be aware of what schools can offer in terms of upstream possibilities" (Crul, 2018, p. 488). Parents who lack the requisite knowledge may inadvertently limit their children's options when choosing a given school. As recent work suggests, knowledge of the educational system especially matters for transitions involving a change of school (Forster & van de Werfhorst, 2019). As a result, transitioning to a higher level after the initial placement not only depends on the student's performance; parents' resources and level of information about the desirable tracks and outcomes also play an important role in securing the best up-streaming possibilities for their children. Forster and van de Werfhorst (2019) have highlighted the specific roles of cultural capital and parental aspirations on the probability of upward transition. With naturalisation increasing both children's long-term educational returns and parents' country-specific resources, we expect naturalised parents not only to have higher expectations, but also to be better equipped to make use of the system's flexibility to provide their children with the best opportunities.

The Dutch educational system also offers possibilities for downward

transitions: when students fail to meet the expectations of a given track, they may be invited to move to a lower level.[4] On the one hand, downward mobility can be perceived as a less desirable option than staying in the current track, since it is likely to result in fewer opportunities for reaching higher education. Families that are well informed and have high educational expectations are therefore likely to enact remedial strategies to compensate for the low performance of their child and avoid downward mobility (Bernardi & Triventi, 2020; Huang, 2020). On the other hand, downward mobility may also be seen as a safety net, one which prevents students from dropping out of school altogether when their current track is inappropriate (Kalmijn & Kraaykamp, 2003). In that sense, students experiencing downward mobility may still benefit from some strategic knowledge and make use of the system's "back doors" to remain in education. Conversely, those who leave school without a starting qualification – that is, without a VWO, HAVO or MBO-level 2 diploma – have limited employment and career prospects (Researchcentrum voor Onderwijs en Arbeidsmarkt, 2009).[5] Various complexities and ambiguities thus surround downward mobility. So although we expect naturalised children to be less likely to drop out of school, we do not formulate any clear-cut hypothesis for the effect that citizenship has on downward mobility.

4. Empirical strategy: a transition-oriented sequence analysis

4.1. Optimal matching between sequences of transitions

Previous work analysing the impact of citizenship on education typically takes an event-oriented or static approach to educational outcomes. School attainment is either operationalised by specific educational transitions, such as the transition from primary to secondary school, (e.g. Cygan-Rehm, 2018; Fibbi et al., 2007; von Haaren, 2016) or by one-time measures of cognitive or behavioural outcomes (e.g. Felfe et al., 2020; Kilpi-Jakonen, 2014). These approaches have their problems, especially when studying stratified and flexible school systems, where students are mobile between tracks. First, focusing on isolated transitions may be misleading when a substantial number of students do not follow the standard path to which they were initially allocated. Second, students obtaining the same diploma are not necessarily comparable because they may have followed distinct paths, with varying educational and opportunity costs. Transitions therefore need to be embedded in students' broader educational careers, both conceptually and methodologically.

Following the life-course perspective (Elder, 1974), we argue that analysing educational trajectories as a whole provides a more comprehensive picture of educational outcomes. In this paper, we use sequence analysis to identify how second-generation students navigate the Dutch educational system. This longitudinal approach is particularly relevant when studying children of immigrants, since their educational *careers* have received limited attention so far (Baysu & de Valk, 2012; D'hondt, Van Praag, Van Houtte, & Stevens, 2016, p. 227).

The technique of sequence analysis has been increasingly used in the social sciences to analyse social processes in a multidimensional and holistic perspective (Piccarreta & Studer, 2019), following seminal work by Abbott and others (1986, 1990). After being coded as sequences of

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[4] Grade retention is also a possibility and is common in the Netherlands. In our population of interest, 24% of children are identified as repeating at least one grade during the observation period. While grade retention is meant to consolidate previous achievements before moving on, transitioning to a lower level is an indication of misplacement.

[5] Education is compulsory (*leerplicht*) until the age of 16 in the Netherlands. However, between 16 and 18, students have an obligation (*kwalificatieplicht*) to stay in education if they have not obtained a starting qualification. Furthermore, they receive government support until the age of 23 to get such a qualification.
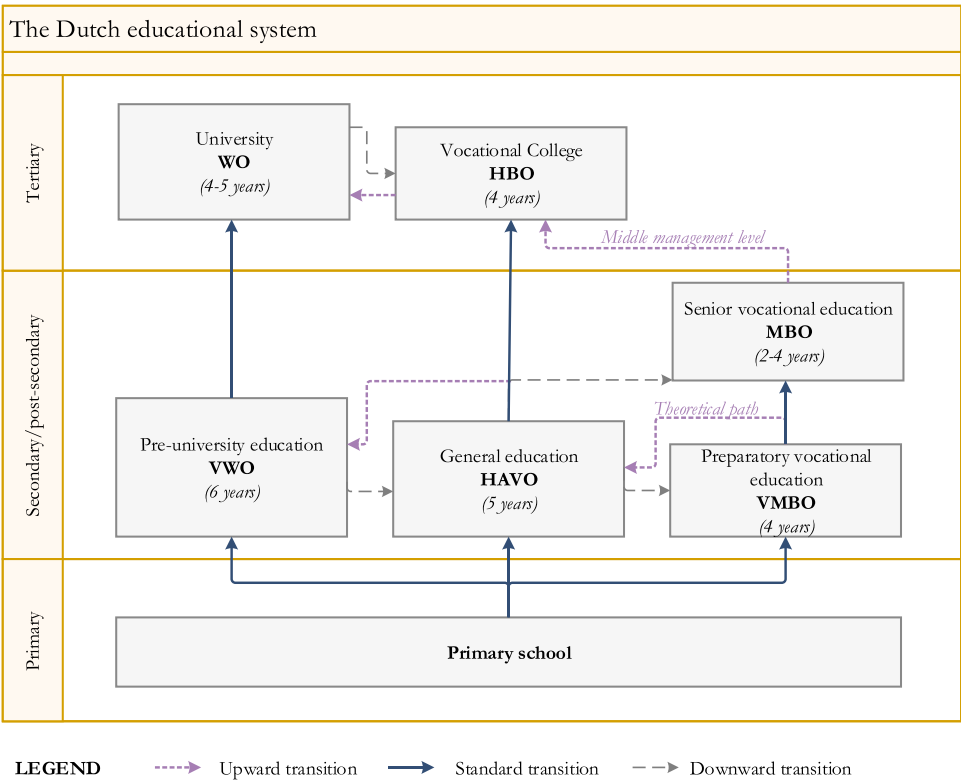
Fig. 1. Diagram of the Dutch educational system.

states (see Table 1), trajectories are typically compared using the optimal matching (OM) distance. OM distance is based on the smallest number of operations required to transform one sequence into another using three types of edit operations: substitution, insertion and deletion. Edit operations are penalised by specific costs fixed by the researcher, and these costs determine the distance's sensitivity to either the timing or the order of events (see Lesnard, 2010). The similarity between each pair of sequences is computed by summing the edit costs for the least costly transformation. Sequences can then be grouped according to their resemblance using standard clustering methods.

Originally developed within biology to compare DNA sequences, OM is now widely used to analyse careers in the social sciences (see Ritschard & Studer, 2018). However, as Biemann (2011) argues, the application of OM to certain types of trajectories is questionable due to important distinctions between DNA sequences and social processes. This is especially the case for careers, which, unlike DNA sequences, grow through time with "a cause and effect relationship between neighbour elements" (Biemann, 2011, p. 199). For example, the probability of following a given educational track at time t is contingent on the track followed at time $t - 1$, which is not reflected in the standard

OM approach. As explained by Elzinga and Studer (2015), "OM is context-insensitive: Each state is handled separately without considering previous or subsequent states" (p. 6). Furthermore, building trajectories as sequences of states does not allow one to distinguish different types of transitions: the transition from state A to B is considered equal to the transition from state B to A. However, when analysing educational careers, it seems crucial to incorporate distinctions between different types of transitions, such as standard or non-standard, upward or downward.

In contrast to the standard focus on sequences of *states*, Biemann (2011) suggests building the trajectories as sequences of *transitions*, which would enable researchers to better capture processes that unfold over time (see Table 1). This transition-oriented approach has been shown to better uncover patterns of mobility than the standard approach, and offers more flexibility to define cost schemes based on theoretical expectations (Biemann, 2011). Although promising, the method has not been applied to actual data beyond Biemann's (2011) paper.

One drawback of Biemann's approach is that it complicates the cost settings, as building the sequences based on the transitions considerably increases the size of the alphabet (see Table 2). To mitigate this issue, we aggregate similar types of transitions to only distinguish between those that are qualitatively different. As described in more detail below, we consider 12 states and we cluster the associated transitions ($n = 132$) into 8 categories, which brings the substitution costs matrix to a manageable size of 8×8. This leaves us with $(8 + 1) * 8/2 = 36$ substitution costs to define (instead of about 9000), that we set based on theoretical expectations.

As our hypotheses mainly relate to the type of transitions that students experience, we base similarity on their mobility profile – that is, on whether they are moving or not between tracks and if so, how – rather than on the specific tracks in which they are enrolled. As a result, the substitution costs are used to further emphasise non-standard transition patterns among students. Indel costs are set so as to allow time warping for standard transitions only, which accounts for potential grade

Table 1
Examples of artificial sequences built on states (a) and sequences (b).

	t1	t2	t3
(a) States approach			
Sequence 1	A	A	B
Sequence 2	A	B	B
Sequence 3	A	A	A
(b) Transitions approach			
Sequence 1	SA	AA	AB
Sequence 2	SA	AB	BB
Sequence 3	SA	AA	AA

Note: In this example, we observe three sequences at time positions *t1–t3*, with an alphabet of two state elements: *A* and *B*. Corresponding transition elements are *AA, AB, BB, BA, SA, SB*, with *S* the start of a sequence.

Table 2
Examples of substitution costs matrices based on states (a) and sequences (b).

(a) States substitution costs matrix

	A	B
A	$c_{A,A}$	$c_{A,B}$
B	$c_{B,A}$	$c_{B,B}$

(b) Transitions substitution costs matrix

	SA	AA	AB	SB	BB	BA
SA	$c_{SA,SA}$	.	.	.	.	$c_{SA,BA}$
AA	.	.				.
AB	.		.			.
SB	.			.		.
BB	.				.	.
BA	$c_{BA,SA}$	.	.	.	.	$c_{BA,BA}$

repetition. We therefore give little weight to the *location* of non-standard transitions, since their timing is not directly relevant to our purpose (see Supplementary Materials, Section 2 for details).

After coding the trajectories as sequences of transitions and defining the corresponding substitution and insertion-deletion costs, pairwise dissimilarities between the sequences are computed using the optimal matching distance[6] . We then group the sequences according to their dissimilarity using the Partition around Medoids algorithm (Kaufman & Rousseeuw, 1990). This partitioning method groups the sequences into a pre-defined number of clusters, based on the clusters' medoids, defined as the sequences whose average dissimilarity to all other sequences in the cluster is minimal. The global quality of the partition is assessed using the average silhouette width (Rousseeuw, 1987), which indicates the extent to which, on average, sequences are closer to the cases from the same cluster than to those from the next nearest cluster. The silhouette width is also analysed at the cluster level to evaluate the internal cohesion of the partition, as recommended by Piccarreta and Studer (2019). Global and local cluster quality are the main criteria for choosing the preferred cluster solution (for details, see Supplementary Materials, Section 3).

4.2. Data and population

We use Dutch administrative registers, supplied by Statistics Netherlands, which offer longitudinal micro-level data covering the entire legally resident population of the Netherlands (Bakker, van Rooijen, & van Toor, 2014). For our research, we follow the cohort of second-generation children who were first enrolled in secondary education in 2008. This choice of the cohort is a trade-off between maximising the length of observation while ensuring sufficient data quality, as educational data become increasingly available and reliable over time. We follow students for eight years until 2016, covering their entire time in secondary education as well as part of their trajectories through higher education (if relevant).

We define second-generation children as those born in the Netherlands to two foreign-born parents, who themselves are born to at least one foreign-born parent. Children of mixed descent are excluded from the scope of our analysis because, having one native parent, they ought to obtain Dutch citizenship at birth by descent. Children born in the Netherlands from second-generation parents – the third generation – are not included either, since they acquire automatic birthright citizenship according to the so-called double *ius soli* principle. For related reasons, we also exclude children from specific origin groups: children originating from the Caribbean territories of the Kingdom of the Netherlands, who are Dutch citizens; and children whose parents come

from the former Dutch colonies and thereby had privileged access to Dutch territory and citizenship (Van Meeteren, Van de Pol, Dekker, Engbersen, & Snel, 2013, pp. 115–116). Based on our definition, there are 14,571 second-generation students who were first enrolled into secondary education in 2008.

We further restrict our study population to children who were not in institutional care ($N = 19$), nor enrolled in special education (*Speciaal onderwijs*, $N = 16$), which is intended for students with learning difficulties or disabilities. Moreover, we exclude students who were enrolled in practical education (*Praktijkonderwijs*, $N = 948$) or adult education (*Voortgezet algemeen volwassenenonderwijs*, $N = 1071$) at some point in their school careers. The reason is that both tracks target very specific groups of students: those with low IQ and learning gaps on the one hand, and the early school drop-outs on the other.

Our final study population consists of 12,505 students.[7] For our regression models, the sample size decreases to $N = 12,249$ following the exclusion of a few individuals with punctual missing values on some of the sociodemographic variables ($N = 256$, 2.0%). For descriptive statistics, see Tables S1–S2 in the Supplementary Materials.

4.3. Operationalisation in the Dutch educational context

We follow students' trajectories from the moment they enter secondary school. Table 3 indicates the different states we coded to map their educational trajectories. After primary school, Dutch students can be allocated to four different tracks: vocational education (VMBO), general education (HAVO), pre-university education (VWO), or bridge class, which is a combination of the first three. We code each track into a specific state, as we do for the three subsequent tracks in secondary or tertiary education: senior vocational education (MBO), vocational college (HBO) and university (WO). Because students may have left education by the end of the observation period or be temporarily registered as being out of school, we identify four additional states: temporary deregistration, outward, dropout, and out of school.[8]

Temporary deregistration We code years as "temporary deregistration" when a student has been temporally deregistered from school while still living in the Netherlands. Temporary deregistration can occur for various reasons: illness, schooling in bordering countries like Belgium or Germany, or enrolment in private institutions, which are not included in the educational registers. Although

Table 3
State elements.

	States
1	Start
2	Bridge
3	VMBO
4	HAVO
5	VWO
6	MBO
7	HBO
8	WO
9	Temporary deregistration
10	Outward
11	Dropout without diploma
12	Out of school with diploma

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[6] We used the R TraMiner package algorithms to calculate the transition-oriented OM distance (Gabadinho, Ritschard, Müller, & Matthias Studer, 2011). The clustering and regressions were performed using Stata 16.

[7] We also exclude individuals who die before the end of the observation period ($N = 12$).

[8] Note that this also ensures sequences of equal length. There is, however, right-censoring in the definition of some of the state elements, as a student identified as an early school-leaver during the observation period may actually go back to school a few years after the end of observation.

temporary deregistrations are quite common and concern 9.2% of the sample, the average duration is short (1.5 years on average).

Outward We code years as "outward" when there is consistent evidence that the student is abroad: the student is not registered as being in education, migration abroad is recorded by the Dutch Immigration and Naturalisation Service (IND), and information is missing from other registers as well. In our sample, 6.1% of students are identified as leaving the Netherlands at some point during the observation period, for an average duration of three years.

Dropout We code years as "dropout" when we are able to determine that a student has left education without a starting qualification (i.e. VWO, HAVO or MBO-level 2 diploma). A substantial proportion (13.5%) of students are identified as early school leavers in our sample.

Out of school We code years as "out of school" when we have evidence that the student has left education with a starting qualification. Due to the limited observation period, this only concerns 19.2% of students in our sample and is associated with short educational trajectories.

Differentiating between these four states is important if we are to uncover the various ways children of immigrants navigate the Dutch school system. Although the data do not enable us to contextualise certain states (notably temporary deregistration) in more detail, this typology of states gives a comprehensive picture of how an entire school cohort makes their way through secondary education.

Finally, we add an artificial state, "start", which enables us to distinguish whether students enter secondary education through bridge class ("Start-Bridge"), vocational education ("Start-VMBO"), or through general or pre-university education ("Start-HAVO/VWO"). Note that the two highest tracks, HAVO and VWO, are merged because the majority of students do not access these tracks directly but rather after one or several years of bridge class.

Table 4 shows all the categories of transitions we used to aggregate similar types of transitions. After their initial transition into secondary education, students can follow the standard route and move up to the level that is provided by their track. For example, a student starting in the pre-university track (VWO) is expected to move on to university (WO), while a student entering general education (HAVO) is mainly preparing to attend vocational college (HBO). These are what we refer to as "standard" transitions. On the other hand, students who were initially placed in the wrong track or who gradually fall behind or move ahead of their peers may need to deviate from the standard route. We therefore differentiate between those moving "downward" to a lower track and those moving "upward" to a more general or prestigious track than the one in which they were enrolled the year before. Two additional categories of transitions take into account atypical trajectories. First, we code as "exit" those transitions in which a student begins with a year of emigration ("outward") or temporary school deregistration ("temporary deregistration"), so as to take into account potential discontinuities in school trajectories. Second, in order to identify the early school leavers, we code transitions ending with dropout as a separate category, "dropout". In the Supplementary Materials, Table S4 gives the full matrix we used to shift the sequence elements from states to transitions.

Table 4
Transition elements.

	Transitions
1	Start VMBO
2	Start Bridge
3	Start HAVO/VWO
4	Standard
5	Downward
6	Upward
7	Exit
8	Dropout

4.4. Multinomial logistic regression and covariates

Following a standard approach in sequence analysis, we use the resulting clusters as a categorical input for multinomial logistic regression analysis. This enables us to assess how clusters are associated with individual and contextual characteristics, although this comes with a number of caveats. One important limitation lies in the fact that we can only analyse how the clusters relate to characteristics that are either constant or measured before the start of the trajectory if we are to avoid anticipatory analysis (Studer, Struffolino, & Fasang, 2018, p. 8). As a result, our time-varying covariates are measured before or shortly after the start of the observation period.

Another caveat relates to causal interpretation. When analysing the relationship between citizenship and educational trajectories, it is important to account for selection into naturalisation: immigrant parents who naturalise are expected to be positively selected for a number of characteristics that are commonly associated with children's educational attainment. Although we are able to control for some of the most important predictors of naturalisation propensity, such as parents' education level or years since migration, the dynamics involved in the naturalisation process are arguably many-fold and largely unobservable, especially when using administrative registers. We therefore use multinomial logistic regression to test associations between citizenship and education, without assuming a cause-and-effect relationship.

Presentation of the covariates

Variable of interest The citizenship status of second-generation students is our main variable of interest. We distinguish three categories: those who are Dutch from birth (45.8% of the sample), those who naturalise together with their parents before entering secondary education (39.0%), and those who are still foreign citizens at that date (15.2%). In the first category, one or both parents naturalised before the child was born. Distinguishing between parental naturalisation before and after birth allows us to analyse the potential effect of the timing of naturalisation.

Educational controls In the sequence analysis, we set the edit function so as to emphasise patterns of (im)mobility relative to a student's initial track. Yet, a student's starting point and subsequent trajectory cannot be fully disentangled, as the initial track determines how far a student can move up or down. As we aim to isolate the effect of citizenship on mobility alone, we control for the initial track in which students are enrolled when entering secondary education.[9] The variable differentiates between vocational education (VMBO), bridge year, and general/pre-university education (HAVO/VWO). Moreover, we expect school trajectory to be influenced by a student's cognitive ability. A student with cognitive potential is more likely to move upward other things being equal. As a proxy for cognitive skills, we use the score obtained in the standardised test at the end of primary school. This comes with a caveat, because scores are only available for students whose schools registered with the main test provider, Cito, representing about 77% of our sample. We assess the selectivity of this group in the Supplementary Materials (Section 4). We use quintiles of Cito score and we group the missing values in a separate category, due to the lack of auxiliary information in the registers to impute the missing scores.

Sociodemographic variables We control for a number of sociodemographic variables that are traditionally associated with educational outcomes. We control for gender, as girls are usually found to outperform boys in education, including among second-generation

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[9] Note that we set null substitution costs between all the starting transition elements in the substitution costs matrix (see Table S5 in Supplementary Materials), which ensures the independence of the outcome from the first education track in the multinomial logistic regression.

students (Fleischmann, 2014). Two household characteristics are included to proxy the parental time and financial resources available to children: the number of children registered in the household and the type of household, either two- or single-parent. We also include a dummy capturing whether the respondent is first-born, since there is evidence that it confers an advantage in education (see, e.g. Kantarevic & Mechoulan, 2006). Finally, we control for whether the child is an EU citizen with a dummy that captures whether mother's or father's country of origin is a member state of the European Union. **Confounding factors** Several parental characteristics are expected to be associated with both naturalisation propensity and children's educational outcomes. First, we account for parents' SES status by including two complementary variables: parents' main source of income, which indicates whether the parents are in employment (including self-employment), are social benefit or pension recipients, or lack any registered source of income; and a dummy capturing whether at least one parent is registered as a homeowner. While homeownership status is a good discriminatory factor in the higher end of the SES distribution, the main source of income captures different profiles at the lower end. To approximate the financial resources available to children, we include household standardised disposable income. We also control for parental education level, albeit imperfectly. Such information tends to be missing and/or unreliable for first generation parents, and is difficult to impute without indication of parents' exact occupation. We take the highest education level obtained among parents, and distinguish between low (primary education), middle (completed some secondary education), and high (bachelor or higher). Missing values, which still represent a non-negligible share (17.3%), are coded as a separate category. In the Supplementary Materials (Section 4), we describe in more detail the construction and limitations of the variable. Finally, we use parents' years since migration and the language spoken at home as proxies for the family orientation towards the host country. Parents who have arrived in the Netherlands at a young age are expected to navigate more easily Dutch institutions, especially if they have been enrolled at some point in the education system (Nielsen & Rangvid, 2012). Likewise, those who are proficient in Dutch may be more likely both to naturalise and to assist their children's educational careers effectively (Dustmann et al., 2012). More details about our covariates are available in the Supplementary Materials, Section 4.

5. Analysis

5.1. Sequence Analysis on educational transitions

Following the steps set out above, we cluster the sequences based on a transition-oriented approach to OM. We select a cluster solution which optimises both the global quality of the partition and the internal cohesion of all clusters (Piccarreta & Studer, 2019). While the average silhouette width reaches a plateau after eight clusters ($ASW \approx 0.82$, see Fig. S3 in Supplementary Materials), cases are not adequately classified in some of the associated clusters ($ASW \leq 0.2$). We therefore prefer a

Table 5
Cluster description and medoids sequences of the six-cluster solution.

	Label	Medoid	N	%
1	Standard	Start Bridge-S-S-S-S-S-S-S	6265	50.1
2	Upward	Start Bridge-S-S-S-S-S-upward-S	2451	19.6
3	Dropout	Start Bridge-S-S-S-S-S-dropout-S	1647	13.2
4	Discontinued	Start VMBO-S-S-S-S-interrupted-S-S	1137	9.1
5	Downward	Start Bridge-S-S-S-downward-S-S-S-S	656	5.3
6	Detour	Start Bridge-S-S-S-downward-S-S-upward-S	349	2.8
			12,505	100.0

Note: "S" stands for "Standard".

six-cluster solution with a smaller average silhouette width ($ASW = 0.78$), but well-defined clusters ($ASW > 0.4$). From a substantive point of view, the six-cluster solution offers meaningful groups with a sufficient level of detail.

Descriptive information on each of the six clusters is provided in Tables 5 and 6 , while Fig. 2 graphically represents the individual sequences within each cluster. In line with our cost setting, students who follow standard trajectories are grouped into the same cluster (cluster 1) and form the largest group (50.1%) of the partition. This group is very homogeneous and substantially contributes to the global quality of the partition (see Fig. S4 in Supplementary Materials). The remaining clusters distinguish students who experienced non-standard transitions during the observation period.

The next cluster represents the second-largest group of the partition, with about 20% of the students. The medoid sequence is characterised by an upward transition the year before the end of the observation period, and Fig. 2 shows that there is limited variation in timing. Most of these students start directly in the vocational track or access this track after bridge class (see the individual sequences based on states elements, Figure S5 in the Supplementary Materials) and experience an upward transition in senior vocational education (MBO), though some move upward a little later. This accounts for the large over-representation of students enrolled in vocational college (HBO) in this cluster: 83% vs. 30% in the full sample. A smaller group who access general education (HAVO) after primary school or bridge class is able to make it to university (WO). It is noticeable that this second cluster barely contains any pattern of downward mobility, and that students from this cluster are the less likely to repeat a grade compared to the other clusters. We therefore label these *upward* transitions.

The third cluster captures sequences that end up with a dropout, typically during the last three years of observation. This cluster, which represents 13.2% of the sample, includes almost all students identified as early school leavers (Table S8). Most of them start in the vocational track (VMBO) or access this track after one or two years of bridge class and subsequently drop out from senior vocational education (MBO) (Figure S5). This cluster confirms earlier work showing that vocational students are particularly at risk of dropout in the Dutch school system (Inspectie van het Onderwijs, 2010, 2016, p. 260), compared to those who follow the general or pre-university tracks. Interestingly, very few individuals experience downward mobility before leaving school without a qualification: less than 2% of downward transitions are observed at each time point within this cluster (result not shown). This suggests that downward mobility can act as a safety net against dropout for some children of immigrants (Kalmijn & Kraaykamp, 2003). Finally, this cluster includes a slight over-representation of students who are identified as being temporarily deregistered or abroad, indicating that in some cases interruptions or disruptions in the school trajectory prevent students from obtaining their starting qualification. The students in this cluster follow what we call *dropout* trajectories.

The fourth cluster groups those who followed standard trajectories but were deregistered from school at some point (9.1%). Although deregistration may occur at any time, it seems to be more likely towards the end, when students have reached the age of majority. Those who are temporarily deregistered from school or identified as going abroad are clearly over-represented in this category: 70% of students experience school deregistration and 36% are identified as being abroad at least one year, vs. 9% and 6% in the full sample, respectively. An important thing to note is that those who leave the Netherlands usually stay abroad several years in a row, while those who are deregistered typically leave school for a year (see Fig. S5). As a result, the sequences in this group are not similar with respect to state duration. What is more, temporary deregistration may occur for various reasons, from illness to a school year abroad. Despite its heterogeneity, this cluster sheds light on a specific group of students who do not complete their entire education in the publicly-funded Dutch education system. To stress this pattern of temporary or definitive deregistration, we label these trajectories as

Table 6
Cluster descriptives: occurrence of state elements within each cluster and in the full sample (%).

	Standard (50.1%)	Upward (19.6%)	Dropout (13.2%)	Discontinued (9.1%)	Downward (5.3%)	Detour (2.8%)	Full sample
Percentage experiencing							
Grade repetition	23.1	15.5	33.3	20.8	40.7	33.2	**23.9**
Temporary deregistration	0.1	3.2	12.6	70.4	7.0	5.2	**9.2**
Outward move	1.2	2.5	10.9	35.9	3.2	5.4	**6.1**
School dropout	0.0	1.4	100.0	0.1	0.0	0.6	**13.5**
Out of school	29.7	10.4	0.0	12.8	17.4	7.7	**19.2**
Percentage enrolled in							
Start Bridge	53.6	50.5	46.7	52.1	75.3	79.4	**53.8**
Start VMBO	39.3	46.0	51.4	43.5	0.6	7.5	**39.7**
Start HAVO/VWO	7.2	3.5	1.9	4.4	24.1	13.2	**6.6**
Bridge	53.6	62.3	50.3	52.2	79.7	84.0	**56.9**
VMBO	71.4	90.0	92.2	75.8	21.5	58.7	**75.2**
HAVO	14.3	32.8	6.1	9.7	91.5	96.6	**22.8**
VWO	14.1	6.9	2.6	7.3	61.9	21.5	**13.3**
MBO	71.5	71.1	86.6	71.3	43.1	69.1	**71.9**
HBO	14.0	82.9	0.0	17.1	57.3	93.4	**30.4**
WO	13.8	9.6	0.0	4.8	4.9	14.0	**9.9**

Note: With the exception of the initial track, for which variables sum up to 100%, the other states are captured by dummy variables which equal one when the state or event is observed at least once during the observation period. As a result, the dummies are not mutually exclusive.
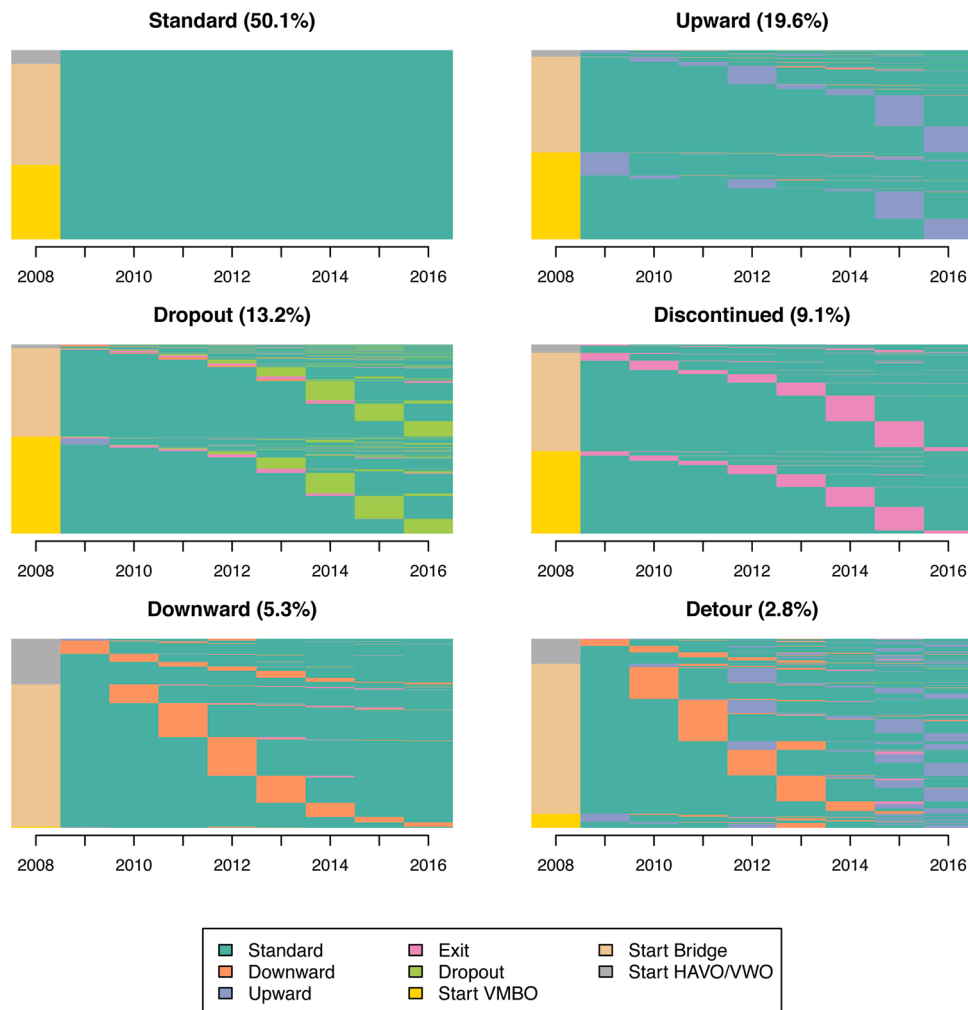
Fig. 2. Index-plot based on transition elements for the full sample (N=12,505).

discontinued.

The fifth cluster, representing 5.3% of the sample, contains sequences characterised by a downward transition. While the medoid sequence suggests that this transition typically occurs four years after enrolment into secondary education, the plot of individual sequences

shows that there is substantial variation in timing. In this cluster, the vast majority of students started in a bridge class (75%, Table 6) and subsequently went into the general (HAVO) or pre-university track (VWO), while a smaller proportion (24%) went directly into those tracks after primary school. Both profiles of students end up moving down later

at various points in time. Interestingly, the percentage of students who repeated at least one grade is particularly high in this group: 41%, vs. 24% in the full sample. This suggests that the track to which students were allocated after bridge class or primary school was too ambitious, leading to subsequent grade retention and, ultimately, downward mobility. Consequently, we refer to students in this cluster as being on *downward* trajectories.

The last cluster includes the smallest group of the partition, representing 2.8% of the sample (*N* = 349). The medoid sequence is characterised by both an upward and a downward transitions a few years apart. The individual sequences show that there is substantial variation in timing: in some cases downward moves are quickly corrected by an upward transition, while in others the upward transition occurs towards the end of the observation period. Being upwardly mobile enables these students to stay longer in education and to access vocational college (HBO) or university (WO) in greater proportions. Notably, in the last year of observation, 75% of these students were enrolled in vocational college, 13% in university and 2% in senior vocational education (MBO) (result not shown). This suggests that these students seek a higher education diploma, although this may come at the price of additional years of schooling. Since these paths towards higher education are marked by initial downward mobility, we label them as *detour* trajectories. The clusters of detour and upward trajectories illustrate that a substantial number of children of immigrants make use of the school system's flexibility to move higher up the education ladder. This is in line with earlier evidence of "long routes" to higher education in the Netherlands, with children of immigrants needing to "stack" diplomas (*diploma stapelaars*) to repair their initial placement in the wrong track (Crul, 2015, 2018, p. 488).

Altogether, this partition shows that a substantial share of students

end up in a different track from the one in which they were initially enrolled; 5.3% end lower and 22.4% finish higher (including the detour routes). This highlights the added value of comparing the starting and ending points of educational trajectories instead of focusing on isolated transitions (Boylan, 2020). In addition to offering a comprehensive picture of how the second generation navigates the Dutch education system, this transition-oriented approach enables us to effectively reduce the complexity the Dutch education system while emphasising non-standard moves. However, it is important to stress that although our clusters are analytically meaningful, cluster membership "cannot be univocally interpreted" (Piccarreta & Studer, 2019, p. 5). In line with the cost setting described above, our clusters are primarily defined based on the *sequencing* of the transitions, to the detriment of other dimensions such as the *timing* and *duration* (Studer & Ritschard, 2016, p. 483). While this is suitable for our research purposes, it should be considered when interpreting the regression results.

5.2. Multinomial logistic regression results

We next turn to the multinomial logistic regression to assess the association between educational trajectories and individual and family characteristics. The six-cluster solution presented above serves as a dependent variable with six possible outcomes. Because we are interested in the odds of experiencing an alternative pathway within the Dutch education system, we use the standard paths as the base outcome. Before discussing our main model, it is helpful to add the different sets of covariates in a stepwise fashion to contextualise cluster membership with regard to our main variable of interest. Fig. 3 shows the variation of the coefficients attached to citizenship using four nested specifications, while Table S11 in the Supplementary Materials provides full details on
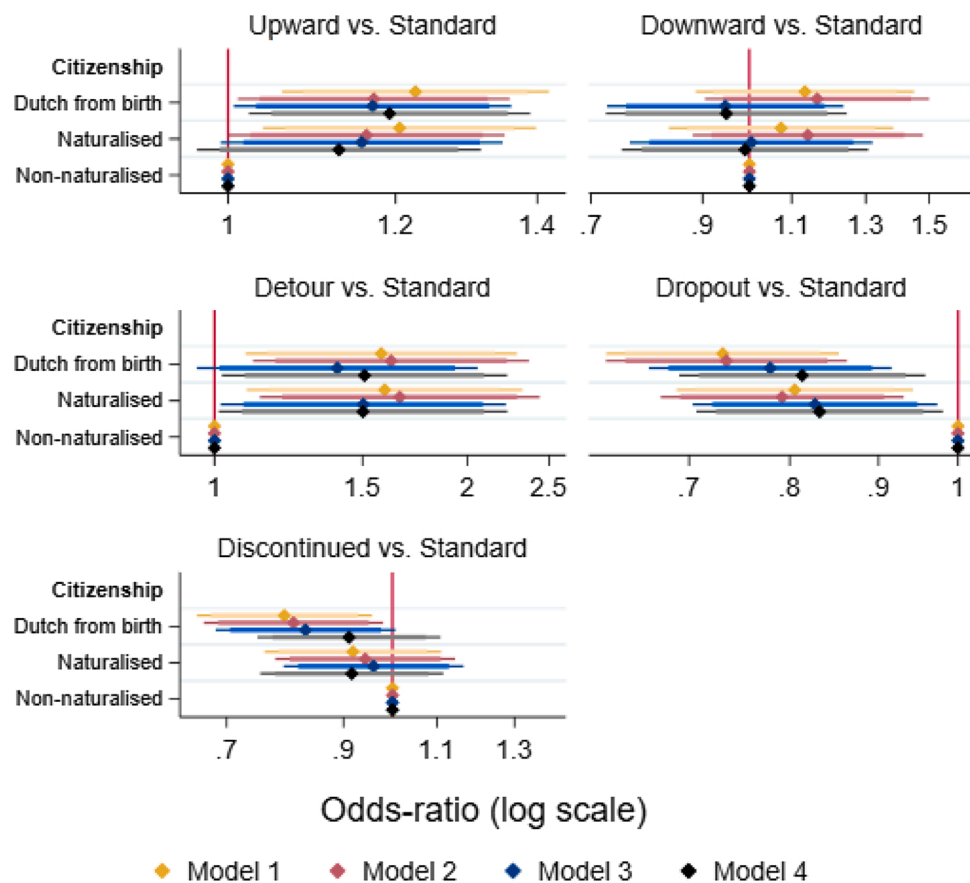

Fig. 3. Plot of the odds of experiencing different trajectories in secondary and tertiary education, by citizenship status. Note: This plot represents coefficient estimates and confidence intervals at the 90% (thick) and 95% (thin) levels. Model 1 only includes citizenship; we introduce step by step the sociodemographic variables (Model 2), the educational controls (Model 3) and the confounding factors (Model 4). The coefficients can also be seen on Table S10 in the Supplementary Materials.

the complete regression model including all covariates.

In Model 1, only citizenship is added to the model, with the foreign citizens as a reference group. Compared to the foreign citizens, second-generation children who are Dutch from birth and those who naturalise before entry into secondary school have a higher chance of experiencing upward or downward transitions than they do of following a standard path. At the same time, they are more likely to follow the standard path than dropout or discontinued trajectories. While the coefficient estimates for citizenship only change slightly when adding the socio-demographic variables (Model 2), there is a more substantial shift when adding the educational controls (Model 3). If we account for the score obtained at the end of primary school and the initial track, those who acquire Dutch citizenship are no longer more likely to follow a downward trajectory than a standard path (the odds ratio shrinks to around 1). The coefficients also decrease for the detour path relative to the standard one, though more moderately. Detailed regression results show that those in the two higher quintiles of Cito score are much more likely to follow a downward trajectory vs. a standard one than those in the first quintile. This suggests that students going down in the course of their educational careers, such as those following a detour or downward trajectory, were initially allocated to a too ambitious track based on the high score they received in the Cito test. The introduction of the educational controls also decreases the magnitude of the coefficient attached to the dropout trajectory. This is related to the fact that those who directly enter the general (HAVO) or pre-university (VWO) tracks have a much lower probability of experiencing a dropout vs. a standard path than those who start in vocational education or – to a lesser extent – in bridge class.

Interestingly, there is little change in the coefficients when adding the confounding factors (Model 4). Only the coefficient associated with discontinued trajectories substantially decreases for the Dutch from birth. Detailed regression results suggest that the effect of citizenship was confounded with parental years since migration in Model 3: children whose parents have stayed more than 15 years in the Netherlands are substantially less likely to experience discontinued trajectories, regardless of their citizenship status.

Overall, citizenship seems to have a moderate protective effect against dropout, while it increases the odds of deviating from the standard path through upward transitions. The latter is especially true for detour trajectories: compared to foreign citizens, those acquiring Dutch citizenship are substantially more likely to experience both downward

and upward mobility than to follow the standard path, with an odds-ratio around 1.5. Those with Dutch citizenship are also more likely to follow an upward trajectory as opposed to the standard path, yet the coefficient is smaller in magnitude, and confidence intervals show that only limited effects are reasonably compatible with the data.

Another noteworthy aspect concerns the timing of citizenship: there are limited differences between those who are Dutch from birth and those who naturalise before 12. The confidence intervals indeed largely overlap for most outcomes, suggesting that, if any, differences in timing are limited. This indicates that, contrary to our expectations, acquiring Dutch citizenship at birth does not offer significant advantages over naturalising before entry into secondary education. One possible explanation is that children benefit from the naturalisation process from the moment their parents seek Dutch citizenship, i.e. possibly several years before the family actually naturalises. If so, those who naturalise in their childhood would experience similar integration dynamics to those who obtain Dutch citizenship at birth. While this would be consistent with previous evidence of anticipatory mechanisms in the naturalisation process (Peters et al., 2017), more research is needed to understand the mechanisms involved.

To assess the magnitude of the effects of citizenship more precisely, we calculate average marginal effects (AMEs), plotted in Fig. 4. AMEs show how the predicted probability of each outcome varies as legal status changes, holding the other variables at their observed values. Getting Dutch citizenship at birth or before the age of 12 increases the probability that a student will be an upward mover by 3.1 and 2.1 percentage points, respectively. Interestingly, this effect size is comparable to that of the effect of parental level of education: children whose parents have a middle or higher education diploma are more likely to follow the upward track by around 2 percentage point, compared to those whose parents only completed primary education (see Table S13). By contrast, citizenship acquisition only increases the likelihood of taking a detour trajectory by around 1 percentage point. As for downward mobility, citizenship does not seem to have any effect. These average marginal effects provide suggestive evidence that naturalised parents are better equipped to help their children move upward after their initial track placement, in line with our hypothesis. However, this advantage could also be driven by unobserved heterogeneity at the family level. Furthermore, the absence of an effect on downward trajectories calls for a deeper understanding of the mechanisms at play. This differential effect may be explained by the fact that schools are a
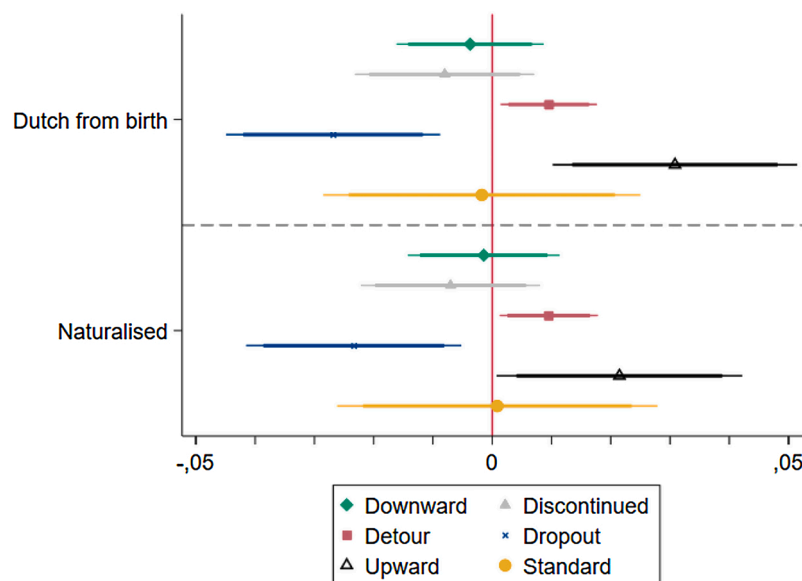

Fig. 4. Plot of the average marginal effects of Dutch citizenship predicting trajectory in secondary and tertiary education (ref. Non-naturalised). Note: This plot represents coefficient estimates and confidence intervals at the 90% (thick) and 95% (thin) levels.

driving force for downward transitions, as in the Netherlands schools gain financially if students graduate within the allocated time span. Conversely, upward transitions may depend more heavily on initiatives that families take.

While the acquisition of Dutch citizenship does not affect the likelihood of following downward transitions, it does influence the probability that a student will leave school prematurely. Compared to foreign citizens, students who acquire Dutch citizenship at birth or before the age of 12 are less likely to experience dropout by 2.7 and 2.3 percentage points, respectively. Although the size of the effect is moderate, it is in the same order of magnitude as that of other important predictors. By way of comparison, students whose parents have a secondary qualification or higher education diploma are less likely to experience dropout by 1.8 and 3.8 percentage points, respectively (Table S13). These results suggest that Dutch citizenship, especially if acquired at birth, has a protective effect against dropout. Naturalised parents may be more informed about the consequences of school dropout for their children's future labour market outcomes, or they may have higher aspirations for their children. While we are not able to tease out these mechanisms, our results overall indicate that citizenship is associated with students' ability to remain in education.

5.3. Complementary analysis

Because AMEs tend to miss variability in effects across cases (Williams, 2012), we also compute marginal effects at representative values (MERs) of the key predictors, such as parental education and years since migration (see Supplementary Materials, Tables S14–S16). While MERs suggest that the relevance of citizenship varies according to parents' resources, differences are rather limited (generally below 1 percentage point) and do not alter our interpretation.

We also use an alternative specification to assess potential biases in our estimations of the effect of citizenship on educational trajectories. As mentioned above, the empirical strategy followed in this paper does not allow the inclusion of time-varying covariates. This is particularly problematic for estimating the effect of citizenship status, since a number of students naturalise during the observation period (see Table S3 in Supplementary Materials). Some of the students we categorise as non-naturalised in the main analysis may be already on their way to becoming Dutch when entering secondary education, which may lead to downward bias in the estimated effect. To calculate an upper bound for the effect of citizenship, we use an alternative specification where we define all students who acquire citizenship after birth within the observation period as naturalised. This leads to very similar patterns to those observed in the main analysis, with the difference that the estimated effects for citizenship are substantially larger in magnitude (see Supplementary Materials, Fig. S6).

6. Conclusion

In most countries, second-generation children do not get automatic birthright citizenship but rather depend on their parent's ability and desire to naturalise if they are to become citizens of their country of birth and residence. While naturalisation requirements have been increasingly strict over recent decades (Goodman, 2010; Vink & de Groot, 2010), we still know little about whether and how citizenship status matters for children of immigrants in *ius sanguinis* regimes (Labussière & Vink, 2020). Following recent developments in the literature (Bean et al., 2011; Felfe et al., 2020; Fibbi et al., 2007; Kilpi-Jakonen, 2014), this paper focuses on the Netherlands to analyse the extent to which children of immigrants who acquire host country citizenship are better able to navigate a complex and stratified education system.

A life course perspective sheds light on the multi-faceted process immigrants go through when seeking host country citizenship. While migration may deeply affect individuals' agency over their life course (Wingens et al., 2011), naturalisation opens up new opportunities in host societies and may foster the ability of immigrant families to navigate complex institutions (Patler et al., 2020). Importantly, the resources and skills they develop during and following the naturalisation process may help them identify desirable tracks for their children and take advantage of the system's flexibility, which is of particular importance in educational contexts combining early selection and between-school tracking (Crul, 2018; Pfeffer, 2008). This paper calls for a more dynamic and comprehensive approach to naturalisation, and adds to the burgeoning literature exploring the influence of migration on youth educational opportunities in a life course perspective (e.g. Baysu & de Valk, 2012; Soehl et al., 2018).

Our paper also contributes to a better operationalisation of educational trajectories using a transition-oriented sequence analysis. Unlike event-oriented approaches to educational outcomes, we map the school careers of a full cohort of second-generation students from their entry into secondary education in 2008 to 2016. This enables us to focus on long-term pathways and to better reflect the complexity of educational careers (Boylan, 2020). Drawing on the transition-oriented approach developed by Biemann (2011), we also offer a context-sensitive method of highlighting (im)mobility patterns based on theoretical expectations. While the identification of broad types of educational trajectories has been sufficient for our purposes, this method has potential for generating more fine-grained typologies of educational careers. In that respect, we argue that transition-oriented sequence analysis may prove especially fruitful for future research on educational trajectories within stratified systems.

In addition to standard paths through the Dutch education system, we identify five clusters of alternative pathways: downward, upward, discontinued, dropout and detour, with the latter referring to those who experience first a downward and then an upward transition. This partition indicates that while a substantial proportion of students (27.6%) make use of the system's back doors to move between tracks, another significant share (22.3%) spends time temporarily or permanently away from the Dutch public school system. In the regression analysis, citizenship stands out as a significant predictor of one's trajectory through secondary and tertiary education. Students who acquire Dutch citizenship before they enter into secondary education are between 2 and 3 percentage points more likely to follow an upward trajectory than those who are still foreign citizens when they start secondary school. Conversely, Dutch citizens are about 2.5 percentage points less likely to dropout.

As can be expected when seeking such a comprehensive and multi-dimensional indicator of educational attainment, other factors, such as cognitive ability or family characteristics, play an equal or larger role than citizenship. Besides, our set of covariates is far from exhausting the range of relevant characteristics: register data do not offer information on students' aspirations and parents' expectations (Boylan, 2020; D'hondt et al., 2016), and we are not able to incorporate characteristics beyond the household to account for potential peer and neighbourhood effects. We therefore interpret our results as preliminary and suggestive evidence that the acquisition of Dutch citizenship influences the way children of immigrants navigate the school system.

While further research is needed to assess the relevance of host country citizenship for children and tease out the mechanisms through which it affects educational outcomes, our findings support the idea that children who are foreign citizens in their country of birth have fewer educational opportunities. Given that most European countries, like the Netherlands, are characterised by a descent-based birthright regime, the potential effect of naturalisation on the life paths of the second generation merits research beyond the Dutch case.

Declaration of Competing Interest

The authors report no declarations of interest.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.alcr.2021.100433.

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