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Does the language spoken at home matter for the education, wellbeing, and sense of belonging of the children of immigrants? And does the answer depend on how we analyse it?

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The Inequalities, Interventions, and New Welfare State (INVEST) aims at increasing wellbeing of Finnish society during childhood, youth and early adulthood and preventing psychosocial risks compromising such development through innovative interventions. Based on cutting-edge research on the conditions and mechanisms involved at different periods of development, INVEST will evaluate and develop various universal and targeted interventions to improve the efficiency of the current welfare state institutions at critical points of the early life course. INVEST aims at providing a new model for the welfare states that is more equal, better targeted to problem groups, more anticipatory as well as economically and socially sustainable. INVEST is a Flagship project of the Academy of Finland.

Does the language spoken at home matter for the education, wellbeing, and sense of belonging of the children of immigrants? And does the answer depend on how we analyse it?

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Abstract

Educational disadvantages of children of immigrants have sometimes been linked to speaking a language other than that of school instruction at home. However, thorough investigations of the alleged benefits for immigrant families of adopting the language of the surrounding society are lacking. We used data from a subset of countries in the 2018 Programme of International Student Assessment (PISA) and analysed reading test scores, educational expectations, sense of belonging at school, and subjective wellbeing (positive affect). Our results suggest that the language used at home is not systematically associated with subjective wellbeing or educational expectations. In some countries, switching the home language to that of the destination country is associated with an increased sense of belonging at school and higher reading scores. We discuss these results with reference to ethnic boundary making and how schools and educational systems can respond to the needs of linguistically diverse students.

Keywords: language spoken at home, children of immigrants, learning outcomes, educational expectations, wellbeing, belonging

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Introduction

In European classrooms, there is a growing number of students with migrant origins from a variety of linguistic backgrounds. In many countries, there is also a growing concern regarding the learning outcomes, wellbeing, and integration of these students. The learning outcomes of the children of immigrants differ significantly from those of their majority peers in many countries (Organisation for Economic Co-operation and Development [OECD], 2018), and in a number of studies these disadvantages have been specifically linked to speaking a language other than the language of instruction at home (e.g., Dustmann et al., 2012; Schnepf, 2007). However, many studies that analyse how the language spoken at home is related to integration do not explicitly compare students whose families have adopted the language of the society in which they live (i.e. switched languages) with those whose families continue to use their language of origin at home. This study examines how the language choices of immigrant families are related to the wellbeing and educational outcomes of 15-year-old students in 11 OECD countries.

The language spoken at home has been used as both a measure and predictor of immigrant integration, but the relationship between the language spoken at home and other dimensions of integration remains poorly understood. There is major disagreement about whether continuing to speak one's language of origin is beneficial or detrimental to other integration outcomes. Minority students' ethnic groups are important social networks that support these students' school success (Portes & Hao, 2004), and their first¹ languages are vital resources for learning other languages and subjects (e.g., Agirdag & Vanlaar, 2018; Cummins, 2001; Ganuza & Hedman, 2018). However, speaking a language other than the language of instruction at home is not without challenges, and the more different the first language and the language of instruction are from one another, the greater the learning gaps (Borgonovi & Ferrara, 2020).

Some studies have recommended that the parents' skills in the destination language should be strengthened, implying that parents should eventually change which language is spoken at home, though these studies did not properly test that this would be beneficial (e.g., Dustmann et al., 2012). In addition, some studies have claimed that the language used at home defines

¹ We use the term *first language* to refer to the languages that children may have learnt first, with a specific assumption that children of immigrants are likely to have learnt a language other than that of the surrounding society first. As a synonym, we also use the phrase *language of origin* to more concretely refer to the languages spoken in the parents' countries of origin. However, we acknowledge that these terms are not completely neutral (see e.g., Eisenclas & Schalley, 2020). Terminology is discussed further in the data and methods section.

students' linguistic abilities more generally (Schnepf, 2007; for a review of similar approaches, see Agirdag & Vanlaar, 2018).

This study addresses the shortcomings of previous research by using data from the 2018 Programme of International Student Assessment (PISA); the groups that were studied were carefully selected in order to compare young people from foreign language backgrounds who continued to speak their language of origin with those who had switched their home language. In addition, how often these young people spoke a language other than the language of the test at home was examined in order to compare different patterns of language use. We analysed language use in relation to four dependent variables: educational achievement (reading test scores); educational expectations; and two measures of wellbeing, a sense of belonging at school and subjective wellbeing in terms of positive affect, with additional robustness checks using other competence and wellbeing measures.

Theoretical expectations linking language use with other incorporation outcomes

Potential benefits of bilingualism and biculturalism

The most direct link between using the language of origin at home and positive integration outcomes has been put forward in the segmented assimilation framework (e.g., Portes & Rumbaut, 2006; Portes et al., 2009). In contrast with straight-line (or neo) assimilation theory, which expects language differences to dissipate over time and generations (Alba & Nee, 1997), segmented assimilation theory expects bi-culturalism and bilingualism to be a major advantage for children of immigrants. This is particularly true for children of immigrants whose parents have low levels of human capital (who may not learn the new language quickly themselves) but who are surrounded by a relatively large co-ethnic group. This is especially important if children experience discrimination (Portes & Rumbaut, 2006). The resources of the co-ethnic group can be tapped more effectively when the language of origin is spoken well. Moreover, maintaining the language of origin supports social capital within families and their wider ethnic groups, both in the new host country and in the country of origin (Feliciano, 2001; Parameshwaran, 2014; Portes & Hao, 2002; Soehl, 2016). A high proportion of students with similar ethnic backgrounds at school has been found to attenuate the negative effects of ethnic origin on grades (Portes & Hao, 2004).

Similarly, the acculturation framework developed by Berry and colleagues (e.g., Berry, 1997; Berry et al., 2006) argues that a positive orientation toward both the co-ethnic group and the majority ('integration') is associated with higher levels of wellbeing than having a positive

orientation to only one ('assimilation' if it is the majority, 'separation' if it is the co-ethnic group) or neither ('marginalisation') of these. This may be due to an individual's social and cognitive flexibility and competencies, as well as their social support and resources in both cultures (for a meta-analysis, see Nguyen & Benet-Martínez, 2013). The continued use of one's first language is an important component of a positive attitude towards one's co-ethnic group. Importantly, students with integration strategies have higher levels of wellbeing than students with assimilation strategies (Lee, 2020); a welcoming attitude, willingness to practice mutual accommodation, and a lack of discrimination from the surrounding society are also crucial for integration (Berry, 1997).

One mechanism through which language use may influence other outcomes is communication between parents and children. For example, Mouw and Xie (1999) highlighted that using the language of parental origin is beneficial for academic achievement when parents are not proficient in the language of instruction, as maintaining the first language allows for within-family communication and parental support of children's education. The language choices that families make are also connected to family members' wellbeing (Tannenbaum, 2005).

Research from the United States has found that students who maintain their first languages have better learning outcomes and are more successful in the labour market than children of immigrants who mainly use the language of the society in which they live (Feliciano, 2001; Lee Blair & Cobas, 2006; Lutz & Crist, 2009); there also exists some supporting cross-national evidence (Agirdag, 2014; Agirdag & Vanlaar, 2018). In addition, strong first-language skills have been shown to significantly affect the learning of other languages and school subjects (Eunjung Relyea & Amendum, 2019; Ganuza & Hedman, 2018). Indeed, a number of studies have shown that bi- or multilingualism has positive cognitive effects (e.g., van den Noort et al., 2019), although there is also contradicting evidence (Lehtonen et al., 2018).

The role of parental resources and language skills

Previous research has indicated that children of parents with low levels of education are more likely to use their first languages at home (Alba et al., 2002; Soehl, 2016), although children of highly educated parents are more likely to be fluently bilingual (Portes & Hao, 2002, Portes & Rumbaut, 2006; Soehl, 2016).

Casey and Dustmann (2008) argued that parental lack of knowledge in the language of instruction may affect children's fluency, which can adversely affect the labour market performance of the second generation. However, while parents' low-level proficiency in the language of the surrounding society can initially cause children to have lower proficiency in the language of instruction than their peers, by middle school they catch up with the children whose parents are more proficient (Bleakley & Chin, 2008). Moreover, first-language use does not prevent native-like learning of the language of instruction (Bylund et al., 2012; Scheffner Hammer et al., 2009; Strobel, 2016).

Importantly, when parents with low levels of proficiency use the language of the surrounding society at home, the language development of their children is not optimally supported (Mueller Gathercole & Hoff, 2007; Scheffner Hammer et al., 2009). However, parents' positive attitudes toward both languages and sufficient interaction in them can positively influence children's language development and benefit their literacy skills (Altinkamis & Simon, 2020; Makarova et al., 2017; Scheffner Hammer et al., 2009).

The role of the societal context

Inter-group relations affect minorities' individual acculturation orientations (Phalet & Baysu, 2020) and their possibilities for equal opportunities (Alba, 2005). The characteristics that constitute boundaries between ethnic majorities and minorities, which may include citizenship, religion, race, and language, vary in different countries (Alba, 2005). In some contexts, the ethnic boundaries are 'bright' and clearly indicate where people belong. In other cases, the boundaries are more ambiguous and 'blurry', and the assimilation of different groups is relatively easy. Bright boundaries can be crossed only when individuals discard their original group's characteristics and enter into another group. In some countries, continuing to speak one's first language may constitute a brighter boundary than in others, which may be relevant to one's sense of belonging.

When immigrant students align with the acculturation norms of their societal context, their integration aims are supported by both the majority and minority social groups, which positively affects their identities and learning outcomes (Phalet & Baysu, 2020). In contrast, when a person who aims to integrate experiences discrimination from the majority group and accusations of disloyalty from the minority group, these effects are negative (Alba, 2005; Phalet & Baysu, 2020). In such situations, those who consider their human capital valuable among the majority group are the most likely to cross boundaries and assimilate (Alba, 2005).

Boundary crossing may be beneficial in some circumstances. Immigrant origin students who primarily speak the language of instruction with friends tend to have higher achievement in mathematics and reading than those who primarily speak their first languages or the two languages equally (Agirdag & Vanlaar, 2018). However, schools have a high potential to influence how cultural diversity is perceived in an academic setting (Heikamp et al., 2020; Phalet & Baysu, 2020); a supportive school culture values students' identities and considers first languages to be valuable learning resources that should be maintained, not lost (Cummins, 2001).

Research aims

Our aim was to examine the associations between the language spoken at home and incorporation outcomes, including both education (reading scores and expectations in the main text, mathematics and science scores as robustness checks in the supplementary tables) and wellbeing (sense of belonging and positive affect in the main text, resilience and eudaimonia as robustness checks in the supplementary tables) for children of immigrants. More specifically, we examined these associations in groups for whom the possibility of language switching was relevant. We believe that previous cross-national research has produced potentially misleading results due to poor measurement of language use at home. Therefore, we replicated the results using the same specifications as previous research and demonstrate how these results changed when we altered the way language use at home was operationalised.

Data and methods

The research was carried out using data from the most recent (2018) PISA study (OECD, 2019b) from the following 11 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Greece, Luxembourg, New Zealand, and Switzerland. These countries had sufficiently detailed information about the students' and parents' countries of birth and the languages spoken at home to support detailed analysis of language-use patterns. They also included a sufficient number of students in the relevant groups to allow for meaningful analysis. Due to a smaller number of observations, the results for Finland and Greece are presented only in the supplementary tables.

Independent variables

The main measure related to language spoken at home from previous research using PISA data is the question of whether a *language other than the test language* (LOTT) is spoken at

home. We began our analyses using this same variable. However, this includes majority students who go to schools where the language is different than what they speak at home, which can include official languages (e.g., French-speaking Canadians attending English-language schools) and regional dialects (e.g., Walloon or German dialects in Belgium; the latter being categorised as speaking another language at home, despite taking the test in German). In some countries, speaking a LOTT may also be due to the test (school) language being a foreign language (e.g., in Luxembourg, 262 students tested in English, less than half of whom spoke English at home).

To address this, we redefined this variable (LOTT) to speaking a *language other than a national language* (LOTN) at home and classified all official languages and regional dialects as national languages. Table A1 (Appendix) shows the distribution of the different language variables in each of the countries analysed.

In the theoretical part of this study, we use the terms *first language* and *language of origin* in an attempt to be as neutral as possible. For analysis purposes, we use the terms *language other than test* (LOTT) and *language other than national* (LOTN). We acknowledge that none of these terms are neutral, and defining languages as “other” may represent a negative view of non-dominant languages (Cunningham, 2018). However, these terms do not characterize the language users as explicitly as terms such as *home language*, *minority language*, *heritage language*, or *mother tongue*. Since there is no agreement on an appropriate term to refer to these languages (see e.g., Cunningham, 2018; Eisenclas & Schalley, 2020; Seltzer, 2019), we have chosen to use LOTT and LOTN (see also Cunningham, 2018, who uses *languages other than English* [LOTE]).

In a next step, we limited the sample of immigrant origin students to those whose parents were born in countries where the official languages of the countries of destination are not spoken; for example, students of Indian origin in Canada were omitted. This allowed for more precision about language switching taking place within immigrant families. The full list of countries of origin that were included for each country of destination can be seen in Table A2 (Appendix). We also excluded all majority students from the LOTN variable (defining them as speakers of national languages) in order to focus the language-related comparison on immigrant-origin children (first and second generation).

Finally, we used the information about how much of each language the students used with their parents, with the answer options being “mostly heritage language” (the term used in the

PISA codebook, see OECD 2019b), “about equally often”, and “mostly test language”. Our final variable grouped students into five categories: majority students, students of the 2.5 generation (one foreign-born and one native-born parent), immigrant-origin students who only or mostly spoke a national language at home (‘switch’), immigrant-origin students who spoke mostly the heritage language at home (‘keep’), and immigrant-origin students who mixed both languages at home (‘mix’). As in the previous step, these analyses only included children of immigrants who were from countries where the official languages of the countries of destination are not spoken.

We acknowledge that there are some limitations when using PISA data. For example, we do not know whether the families we defined as ‘switching’ ever spoke the languages of their country of origin; we made these assumptions based on their country of birth. Similarly, the estimated difference between ‘keeping’ and ‘switching’ cannot be interpreted as causal; we relied on cross-sectional data, language choices may also have been endogenous to the outcomes studied, and we had limited background information about the students.

Furthermore, since the students were only able to choose one language (other than the test language) to describe their home language, the characterization of their linguistic biography may have been overly simplified, and multilingual families were represented as speaking only one LOTT or LOTN.

Dependent variables

Our dependent variables were reading scores, expectation to complete a university-level education, sense of belonging at school, and subjective wellbeing in terms of positive affect (see below for additional dependent variables used in robustness checks).

In the PISA 2018, reading literacy is defined as “understanding, using, evaluating, reflecting on and engaging with texts in order to achieve one’s goals, to develop one’s knowledge and potential and to participate in society” (OECD, 2019a, p. 28). The PISA 2018 reading test used a multistage adaptive design (MSAT) to improve measurement accuracy and efficiency, in particular for the very low and high performers (OECD, 2021). As in previous PISA cycles, this resulted in a set of plausible values for each student. The mean reading scores from the countries in our sample ranged between 460–520, with a standard deviation of around 100.

Educational expectations are individuals’ aspirations and expectations for educational ambitions, which they aim to fulfil in a relatively realistic manner (Feliciano & Lanuza,

2016). These expectations are important in predicting later success. Children of immigrants often have high educational expectations, which may be due to a greater interest in school, higher parental expectations, and the cultural capital that comes from using a language other than the majority language in early childhood (Feliciano & Lanuza, 2016). In the PISA 2018, students were asked whether they expected to complete specific levels of education; we used the information on whether they expected to complete International Standard Classification of Education (ISCED) levels 5A or 6 (ISCED-97 5A programmes are largely theoretically based and intended to provide sufficient qualifications for gaining entry into advanced research, often bachelor's degrees at universities). The mean educational expectations of the countries in our sample ranged between 30–70%.

The OECD (2019a, p. 230) defines wellbeing as “good mental states, including all of the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences”. This includes cognitive, psychological, and social aspects; the psychological dimension includes life satisfaction, resilience, and sense of meaning in life, whereas the social dimension includes the sense of belonging and experiences of bullying (Govorova et al., 2020). In our analysis, we used sense of belonging at school and positive affect as factors related to subjective wellbeing.

A feeling of belonging is a feeling of being accepted as a member of a group (Lambert et al., 2013), or a “feeling of being accepted, respected, included and socially supported in the school environment” (OECD, 2019a, p. 273). Being part of a group is a basic need for human beings (Lambert et al., 2013), and a sense of belonging is not only crucial to life satisfaction, it also affects students' learning outcomes (Heikamp et al., 2020). Moreover, students who feel a sense of belonging at school also report fewer experiences of bullying (Govorova et al., 2020). Overall, first generation immigrants reported a weaker sense of belonging at school than majority students (Borgonovi, 2018). According to Yeasmin and Uusiautti (2018), social relationships and the level of integration at school seem to be the most important factors for children of immigrants' success. In the PISA 2018 student questionnaire, a sense of belonging was measured with six items on a four-point Likert scale: “I feel like an outsider (or left out of things) at school. I make friends easily at school. I feel like I belong at school. I feel awkward and out of place in my school. Other students seem to like me. I feel lonely at school” (OECD, 2021). The mean level of belonging from the countries in our sample ranged between -0.20–0.40, with a standard deviation around 1.

The OECD (2019a, p. 230) defines affect as “one’s emotional state, typically at a particular point of time”. Positive affect is an individual’s “pleasurable engagement with the environment”, and it includes enthusiasm, interest, joy (Clark et al., 1989, p. 206), happiness, and contentment (Pressman et al., 2019) and may positively influence health (Pressman et al., 2019). In the PISA 2018 student questionnaire, positive affect was measured by asking students three Likert scale items: “Thinking about yourself and how you normally feel: how often do you feel as described below? Joyful, Cheerful, Happy” (OECD, 2021). Among the countries we analysed, there was no data on the items related to positive affect for Australia, Belgium, and New Zealand. The mean level of positive affect from the other countries in our sample ranged between -0.10–0.25, with a standard deviation around 1.

Control variables

Our control variables were gender, student’s grade in comparison with the modal grade for 15-year-olds in the respective countries, mixed heritage parents (not in the models where the 2.5 generation was its own category in the language-use variable), and, for the first-generation students, age at arrival (native-born children coded as 0). Some models included a control for parental country of birth; the countries of birth available depend on the survey country, and we used the mother’s country of birth unless this was missing or the mother was native born and the father was not. Most models also controlled for parental socioeconomic (SES) status by using the OECD’s index of economic, social, and cultural status (ESCS); the results with and without this control are in the supplementary tables (S1–S7).

Methods and robustness checks

Linear regression models were run separately for each country. For educational expectations, we ran linear probability models. We took into account the stratification of the sample by using the recommended weighting procedure from the OECD. For analyses of the reading scores, we ran the models with the ten plausible values and replicate weights. We used the user-written Stata `repest` command (Avvisati & Keslair, 2014) for all our analyses, including the descriptive results (in Table A1).

The results of the different models are presented as follows: First, we analysed the association of the language spoken at home with reading scores and educational expectations, then with students’ sense of belonging and experienced positive affect. Within each of these outcomes, the difference between LOTT or LOTN speakers and those who spoke only the test/national language at home (M1a, M1b) is presented first. In the second set of models, we

added a control for parental country of birth (M2a, M2b), since it has been hypothesised that the association between LOTT and test scores may be due to compositional effects of countries of origin. In the third model, we redefined the LOTN variable and excluded some students, as described previously (M3). The last model examined the differences between those who mainly or only spoke a national language at home ('switch') and either those who primarily spoke their language of origin ('keep') or those who spoke both languages ('mix') (M4). All of these models controlled for parental SES in addition to the previously mentioned control variables. We then present the last model (M4) again, with the reference category having been changed to the majority and including results where parental SES was not controlled. The models replicating previous analyses where LOTT and LOTN were added as explanatory variables to explain the differences between children of immigrants and the majority are presented in the supplementary tables (M00 and M0, Tables S1–S4) and commented on in the main text.

Our results are presented in graphical form in the main text. The number of observations for each dependent variable and country combination can be found in the supplementary tables. Models 2a and 2b have the same number of observations as Models 1a and 1b in Tables S1–S4, and Model 3 has the same number of observations as Model 4 in Tables S5–S7. We applied listwise deletion for missing values, and the analyses of the different dependent variables used different samples based on missingness in the respective dependent variables.

The supplementary tables also include the results using the two other competence measures of the PISA 2018, mathematics and science (Table S5), as well as the two other wellbeing measures, resilience and eudaimonia (Table S6). For educational expectations, we included the results controlling for competences, which is an average of all ten plausible values across all three competence measures divided by 100 (Table S7).

We tested a number of other specifications, such as including the amount of each language spoken with mother and father separately and interactions between language use and parental SES. However, these did not produce clear results, thus we prefer our modelling strategy of overall language use with both parents and no interactions.

Results

Reading scores

The results for the different definitions of LOTT and LOTN and their associations with reading scores are presented in Figure 1. Overall, there was a negative association between

speaking a LOTT or LOTN at home and reading scores. In the countries where there is a difference between LOTT and LOTN, the estimate for LOTN was smaller than for LOTT, although this difference was substantial only in Belgium, Canada and Luxembourg (comparison of M1a and M1b). In most countries, speaking a LOTT or LOTN was associated with reading scores that were 20–30 points lower than speaking a test/national language at home, which in many cases is in the same order of magnitude as the gender difference; Germany stands out as having the largest difference at approximately 42 points.

The supplementary tables includes results where LOTT and LOTN were added to models that initially controlled only for generation, then additionally for parental SES. These models confirmed the results of previous research: Using the measures of LOTT and LOTN “explains” a substantial proportion (and in some cases all) of the disadvantages of children of immigrants that is unexplained when controlling only for parental SES. This was particularly the case in Austria, Belgium, Denmark, Finland, Germany, Greece, and Switzerland. In Australia, Canada, and New Zealand, the children of immigrants tended to obtain higher test scores than their majority peers, and this difference increased when controlling for LOTT/LOTN. In Luxembourg, controlling for LOTT showed an increase in the disadvantages of children of immigrants, while controlling for LOTN explained these disadvantages.

Adding a control for country of origin (M2a, M2b) reduced the estimated association between LOTT/LOTN and reading scores in some countries (Germany, Luxembourg, and Switzerland), but the difference was slight, and in a few countries these estimates increased (Australia and Canada). A more substantial change was seen when we restricted the sample to children of immigrants from countries where the national language of the destination country is not an official (or substantial minority) language (M3). Here, we also redefined all majority children as speaking a national language at home. Except in Belgium and Germany, this lowered the estimate for LOTN; the estimate was insignificant (and close to zero) in Australia, Canada, Denmark, and New Zealand. In Belgium the estimate became insignificant but hardly changed in size.

Further distinguishing between children of immigrants who mainly spoke a LOTN at home from those who mixed languages or spoke mainly a national language (now combined with children of immigrants who did not report speaking a LOTN at home) replicated the results from the previous step (M4 vs. M3) for both ‘keepers’ and ‘mixers’. The main difference was that in Germany, the difference between ‘keepers’ and ‘switchers’ was smaller (25 points)

and not statistically significant, whereas that between ‘mixers’ and ‘switchers’ was larger (50 points) and statistically significant. There were also indications in other countries that children mixing the two languages had the lowest reading scores, though the difference was, in many cases, very small.

Figure 1. The estimated association of LOTT and LOTN with reading scores across different countries and models (95% confidence intervals around estimates).

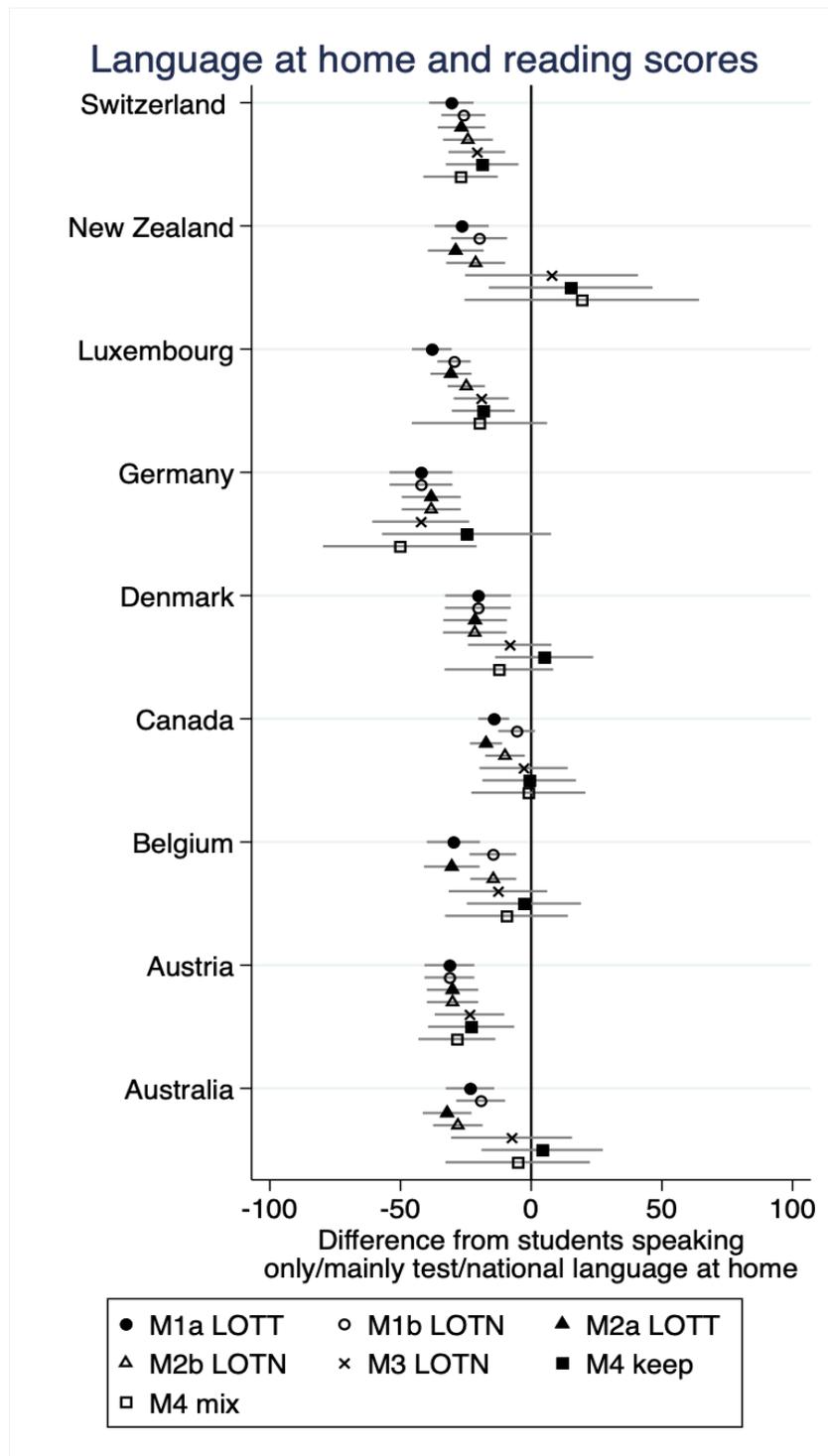
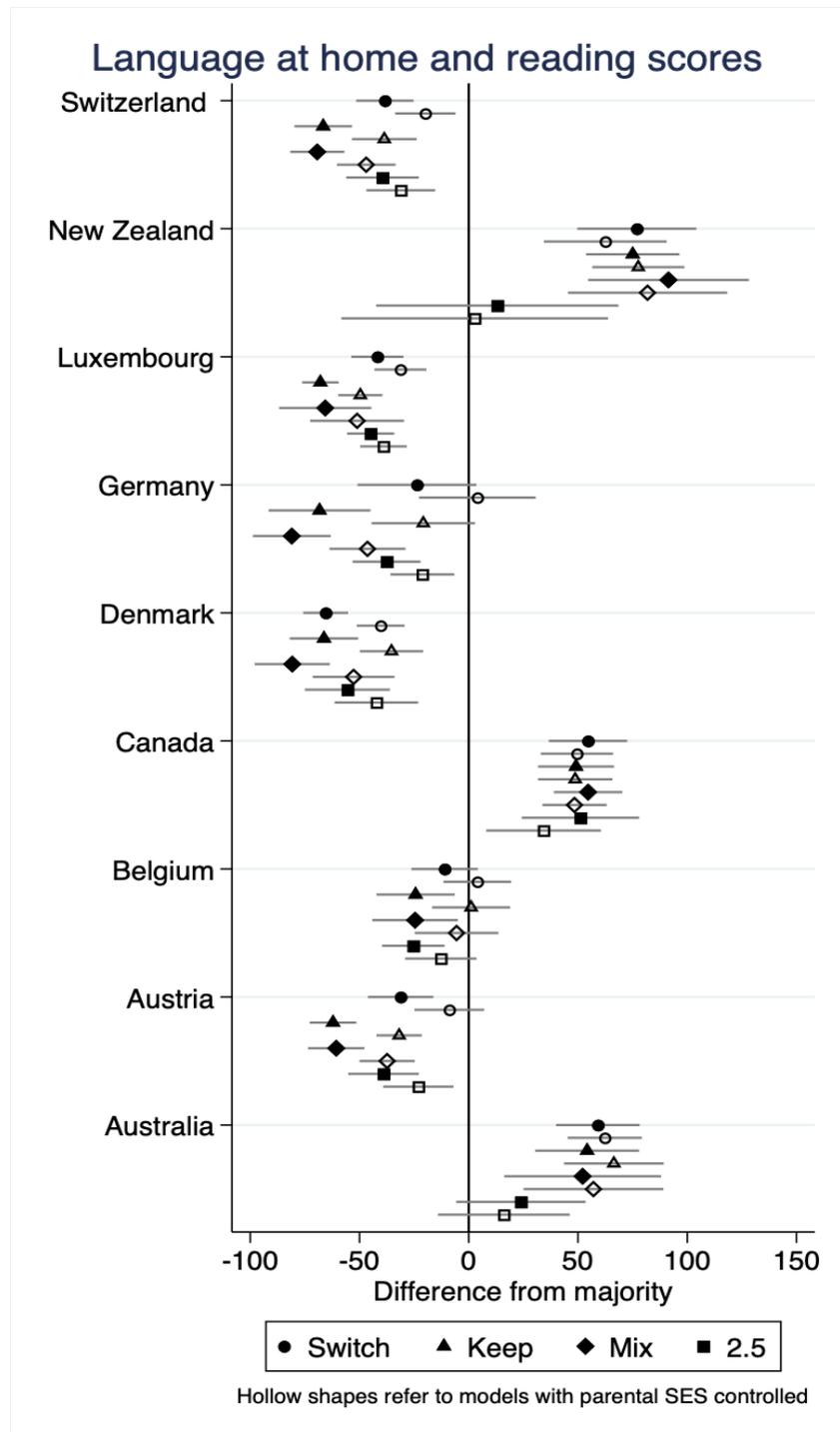


Figure 2 redisplay the results of M4 using majority students as the reference category and with additional estimates where parental SES was not controlled. Across the countries, there was variation in how much the parental SES explained the reading skills gap between the majority and different groups of children of immigrants. In some countries (Austria, Belgium, Denmark, Germany, and Switzerland), parental SES explained the gap more for ‘keepers’ than ‘switchers’, highlighting the fact that the ‘keepers’ tended to come from lower SES backgrounds than the ‘switchers’. In addition, only in Austria did the ‘switchers’ close the gap with the majority, whereas the ‘keepers’ (and the ‘mixers’) did not. In Germany, the trend was similar, though the ‘keepers’ did not differ significantly from the majority (‘mixers’ had the lowest reading scores).

The supplementary tables also display the results for M4 using all three competence measures (Table S5). In many countries, the results of ‘keeping’ versus ‘switching’ were consistent across all three measures. However, in Australia, Canada, and New Zealand, the ‘keepers’ had significantly higher mathematics scores than the ‘switchers’, and in Canada they also had higher science scores (all of these in the range of 20–50 points).

Overall, speaking a LOTN at home was associated with lower reading scores than switching to a national language in Austria, Luxembourg, and Switzerland (18–23 points). In Finland and Greece, the negative association was at least as big but not statistically significant (50 and 30 points respectively), which was the same for the ‘keepers’ in Germany (25 points). On the other hand, there was no association between language use and reading scores in Australia, Belgium, Canada, Denmark, and New Zealand.

Figure 2. The estimated difference between reading scores of different immigrant-origin and majority students across different countries, with and without controlling for parental SES (95% confidence intervals around estimates).



Educational expectations

Figure 3 displays the same set of models as Figure 1 but for students' educational expectations. The results from M1a/b show that speaking a LOTT or LOTN was associated

with higher educational expectations in Australia, Austria, Canada, and New Zealand (in the range of 5–10 percentage points), whereas in Luxembourg it was associated with lower educational expectations (5 pp). Overall, there was very little difference between LOTT and LOTN, except for a possible difference in Finland (LOTN 10 pp versus LOTT 7 pp, see Table S2). The supplementary results (Table S2) suggest that in most countries, the children of immigrants tended to hold higher educational expectations than their majority peers, particularly after controlling for parental SES. Moreover, in the countries where speaking a LOTT or LOTN was associated with higher educational expectations, the higher expectations of children of immigrants were attenuated slightly by including this control.

Controlling for country of origin (M2) reduced the differences between the language groups in many countries, most notably in New Zealand. Focussing on groups that we know are from countries where the destination country's national languages are not spoken and defining all majority students as speaking a national language (M3) changed the estimates for LOTN slightly, most notably in Austria. Here, the positive association disappeared, and there were no statistically significant differences between language groups. Furthermore, in Australia and Canada, while the estimate did not change much, it did become no longer statistically significant. The only country with a significant negative association between LOTN and educational expectations was Greece (not shown).

Distinguishing how often a LOTN is spoken with parents (M4) also did not elicit much change. Only two of the estimates were statistically significant: In Canada, 'keepers' tended to have higher educational expectations than 'switchers' (7 pp, the difference between 'mixers' and 'switchers' was almost the same but not significant, as was the difference between 'keepers' and 'switchers' in Australia, Belgium and Germany), whereas 'mixers' had lower expectations than 'switchers' (or 'keepers') in Switzerland (10 pp).

Figure 3. The estimated association of LOTT and LOTN with educational expectations across different countries and models (95% confidence intervals around estimates).

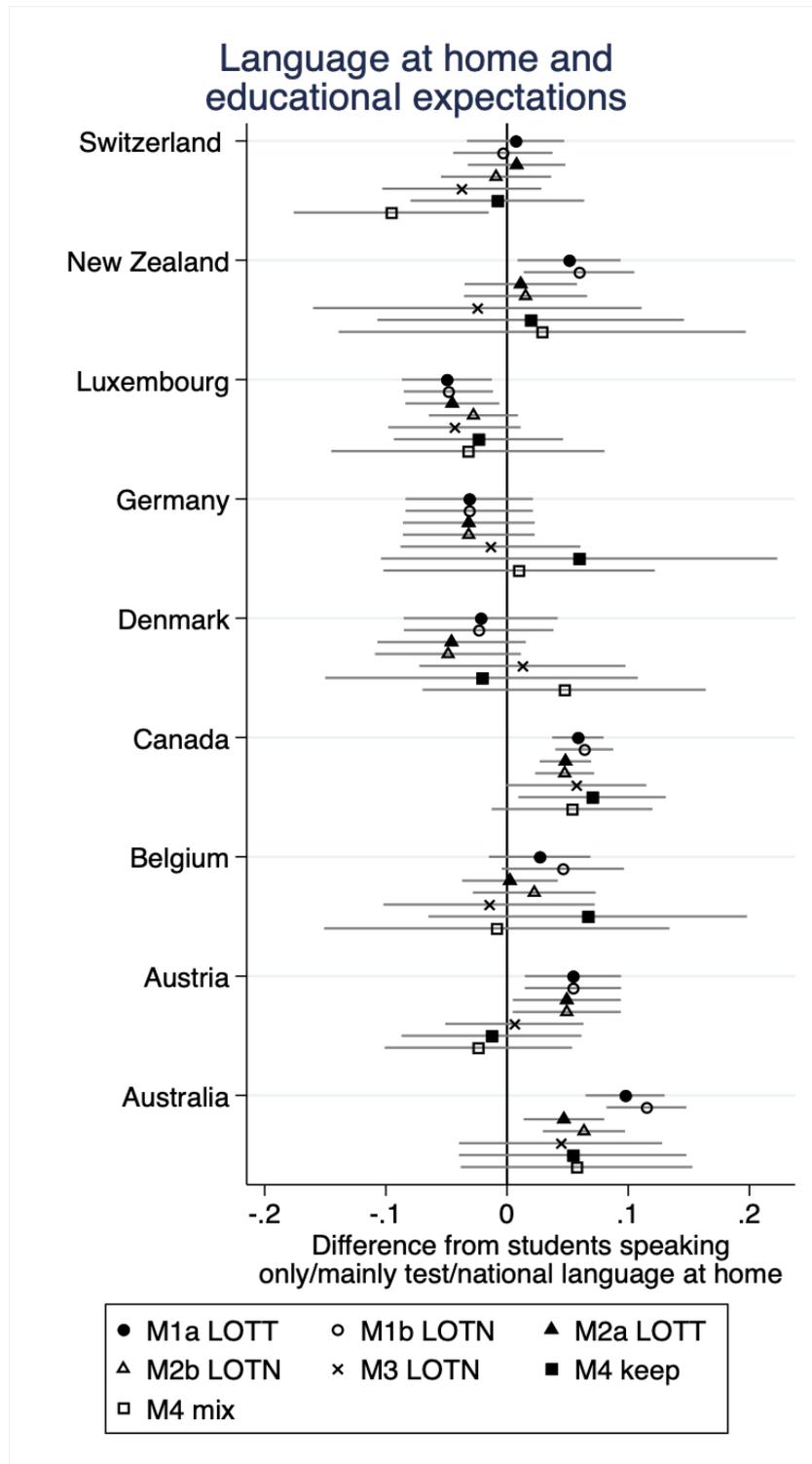
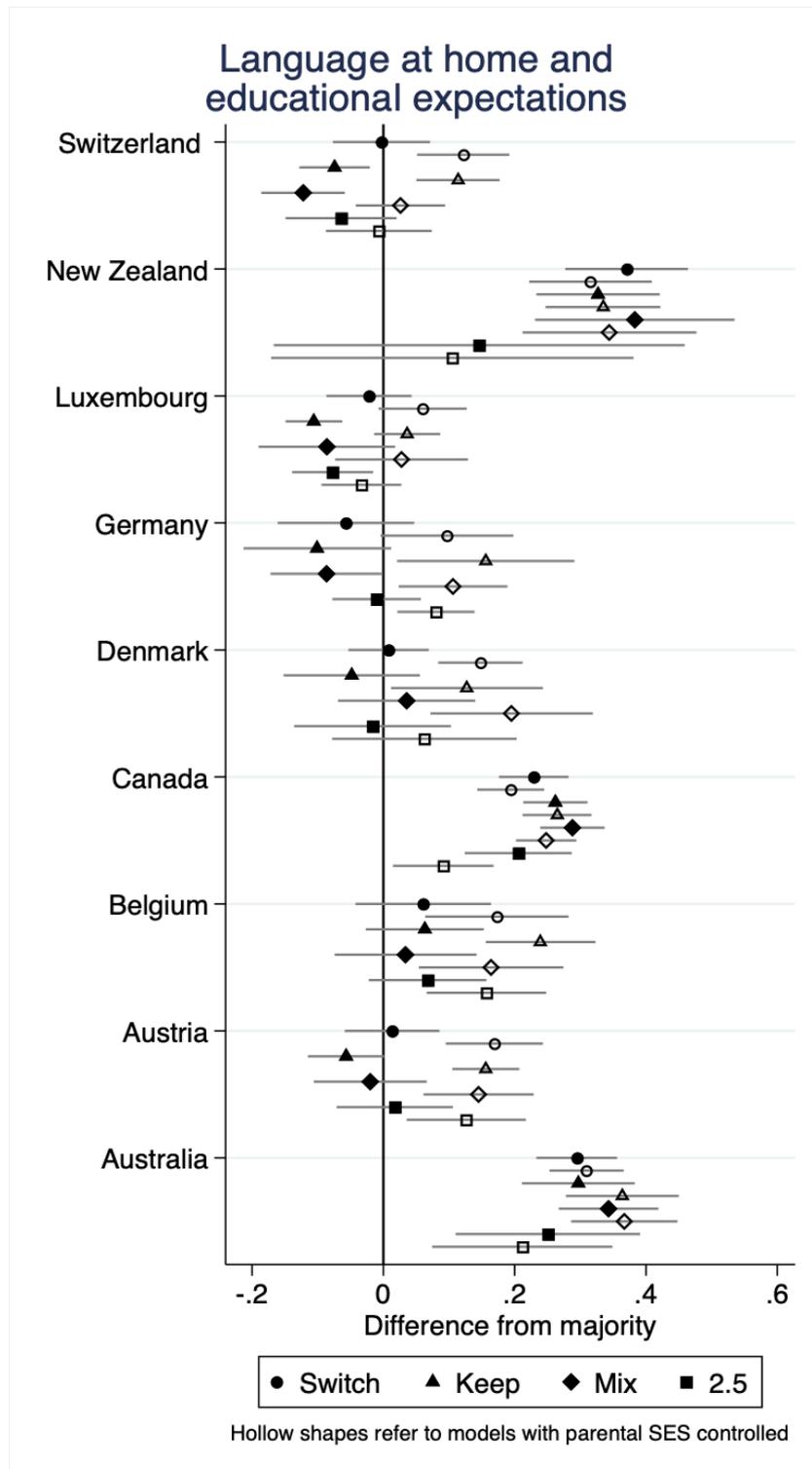


Figure 4 redisplayes the results from M4 with the majority group as the reference category. The figure reconfirms that children of immigrants held higher educational expectations than their majority peers, although in some countries, this was only the case after controlling for

parental SES (and in Luxembourg not even then). In Switzerland, both ‘keepers’ and ‘switchers’ held higher expectations than the majority, but ‘mixers’ did not.

Figure 4. The estimated difference between the educational expectations of different immigrant-origin language groups and majority students across different countries, with and without controlling for parental SES (95% confidence intervals around estimates).



The supplementary tables (Table S7) display results where an average of all plausible values for competences was added as a control (M5a and M5b with different reference groups), as previous educational achievement is a major driver of educational expectations (and transitions). In these models, there were no statistically significant differences between ‘keepers’ and ‘switchers’. In Germany ‘mixers’ had higher educational expectations than ‘switchers’ (11 pp); the size of this difference was the same as between ‘keepers’ and ‘switchers’. In Belgium and Canada ‘keepers’ also continued to hold higher educational expectations (5–6 pp) than ‘switchers’ but the difference was not statistically significant. Overall, continuing to speak a LOTN with parents was weakly associated with higher educational expectations than switching to a national language. Canada was the only country where the difference was statistically significant (before controlling for competences), though the estimates from some of the other countries were similar in size.

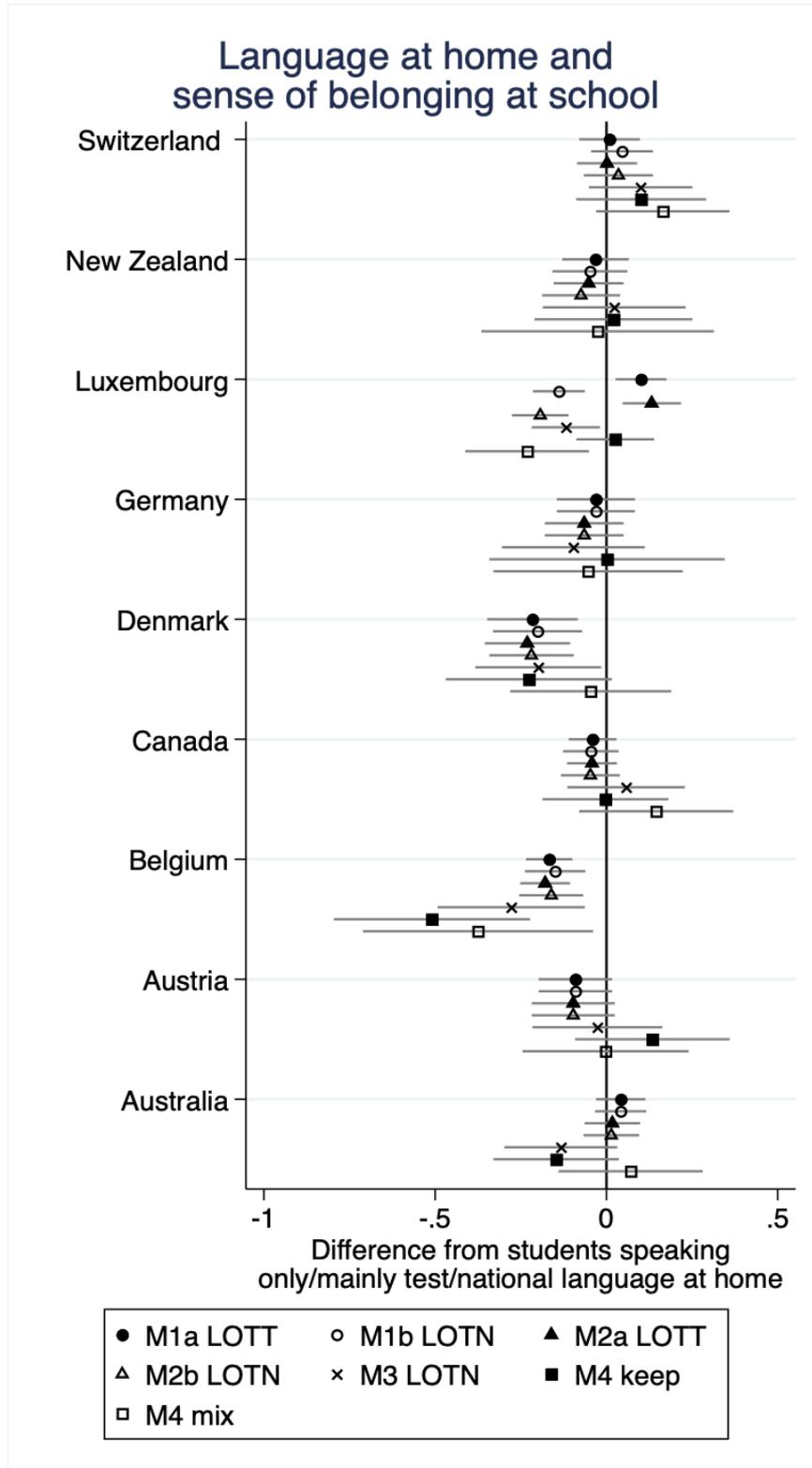
Sense of belonging

Figure 5 shows the main results for sense of belonging at school. In Belgium and Denmark, speaking a LOTT or LOTN at home was associated with a significantly lower sense of belonging (M1a, M1b), as was the case in Finland and Greece (Table S3), with the estimated difference approximately -0.14–0.22. In these instances, the difference between LOTT and LOTN was relatively small (though in Finland the estimate for LOTN [-0.30] was 1.5 times that for LOTT [-0.15]). However, in Luxembourg, LOTT was associated with a higher sense of belonging than speaking the test language at home (0.10), whereas LOTN was associated with a lower sense of belonging than speaking a national language at home (-0.14). Adding LOTT/LOTN did not change the association between immigrant generation and sense of belonging much in the countries where these language variables were insignificant (Table S3). However, in Belgium and Denmark, second generation students had a significantly higher sense of belonging than their majority peers after controlling for language used at home, as did first generation students in Finland. In Luxembourg, controlling for LOTN substantially reduced the estimated lower sense of belonging among the children of immigrants.

Adding parental country of origin (M2) barely changed the results. Limiting the sample to children of immigrants from countries without shared languages and redefining all majority students as speaking a national language (M3) also did not change the results much. In Belgium, the negative estimate increased somewhat (though with a relatively wide

confidence interval); the estimates for Finland and Greece were not statistically significant even though they were in the same order of magnitude as in the previous model.

Figure 5. The estimated association between LOTT and LOTN and sense of belonging across different countries and models (95% confidence intervals around estimates).

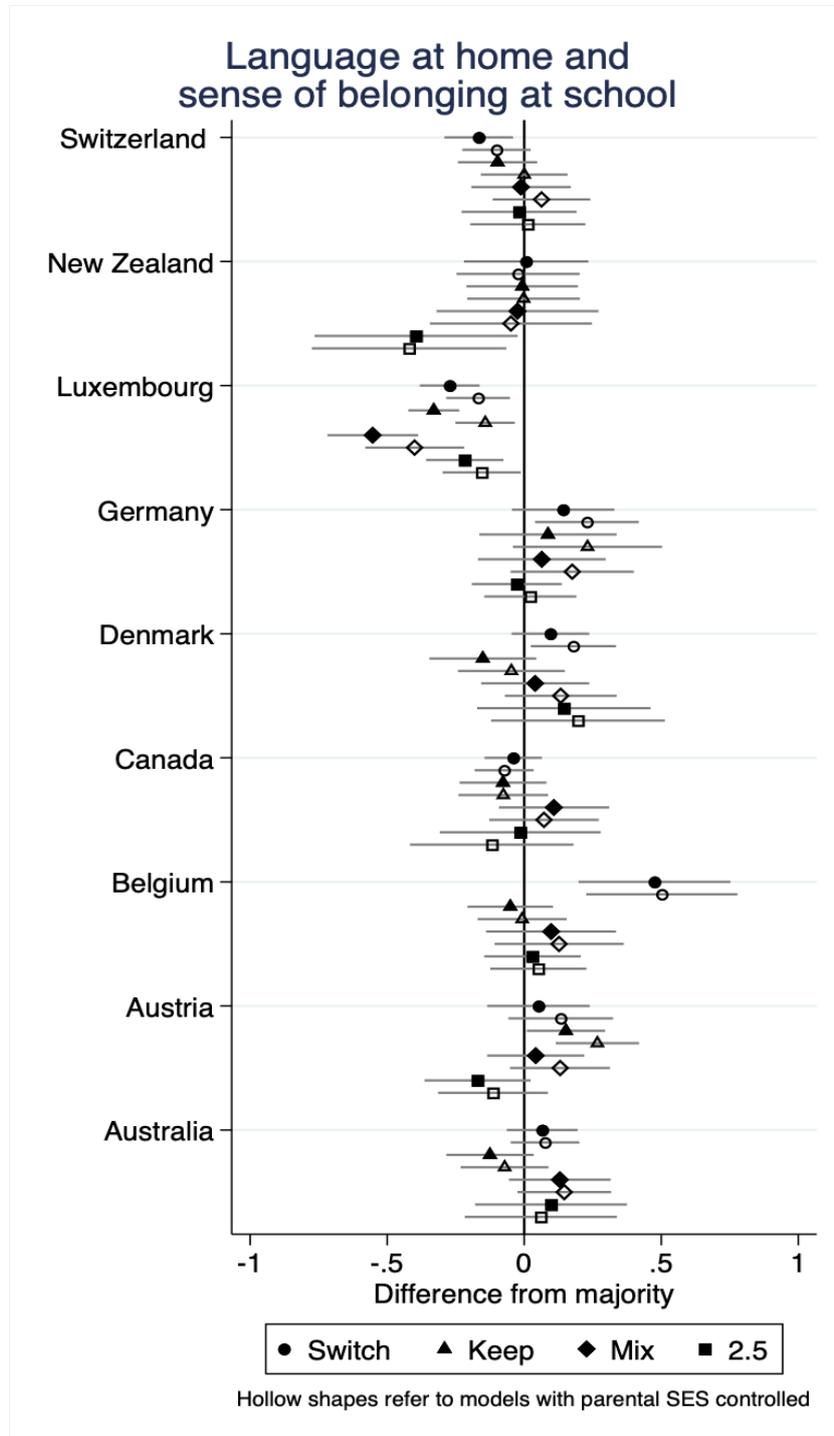


The last model (M4) separated students based on the frequency with which they spoke different languages with their parents. The main differences were that the negative association in Luxembourg was solely attributable to 'mixers', whereas in Finland (see Table S6) and Denmark it was the 'keepers' (-0.42 and -0.23 respectively, although the latter estimate is not statistically significant). Moreover, in Australia, 'mixers' displayed a higher sense of belonging than 'keepers', although neither group differed significantly from 'switchers'. In Belgium, the lower sense of belonging of both 'keepers' (-0.51) and 'mixers' (-0.37) relative to 'switchers' increased in this last model.

Figure 6 displays these same results using majority youth as the reference category. The groups that differed significantly from the majority in terms of having a higher sense of belonging (after controlling for parental SES) were 'switchers' in Belgium, Denmark, and Germany, and 'keepers' in Austria. All groups of children of immigrants (who were included in these analyses) on average had a lower sense of belonging than majority students in Luxembourg, as did the 2.5 generation in New Zealand.

Overall, the children of immigrants did not differ significantly from the majority in terms of their sense of belonging at school in most countries, the most notable exception being Luxembourg. Nevertheless, language 'switching' was associated with a higher sense of belonging than 'keeping' in a number of countries, most clearly in Belgium and Finland, and to some extent also in Denmark.

Figure 6. The estimated difference in sense of belonging of different immigrant-origin language groups from majority students across different countries, with and without controlling for parental SES (95% confidence intervals around estimates).



Subjective wellbeing

The final dependent variable that we considered was subjective wellbeing (positive affect). Figure 7 shows the main results for this variable; overall, language spoken at home was not statistically significantly associated with wellbeing in any of the countries we analysed, regardless of how it was operationalised. Both the supplementary table (S4) and Figure 8 confirm that the children of immigrants did not tend to differ from their majority peers in their level of wellbeing. One exception to this was in Denmark, where children of immigrants tended to have higher levels of wellbeing than their majority peers (Table S4); among the language groups considered, this was particularly relevant for ‘switchers’ (Figure 8). In addition, ‘mixers’ in Germany and ‘keepers’ in Luxembourg had significantly higher levels of wellbeing than the majority.

M4 was also run for the two other measures of wellbeing in PISA: resilience and eudaimonia. These results can be seen in the supplementary tables alongside the model for the two measures presented here (Table S6). No statistically significant language group differences were found for these dependent variables in any of the countries analysed.

Figure 7. The estimated association of LOTT and LOTN with subjective wellbeing across different countries and models (95% confidence intervals around estimates).

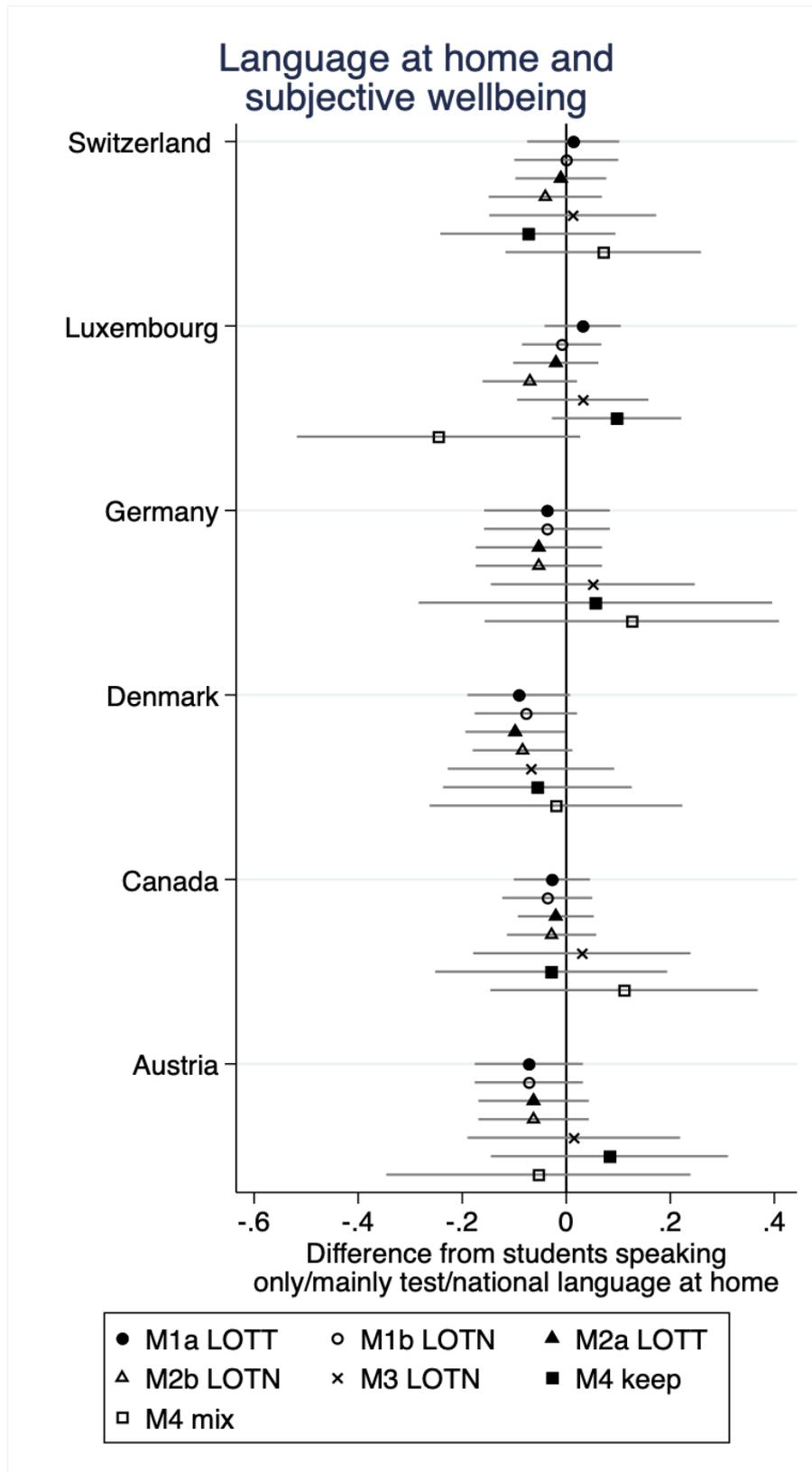
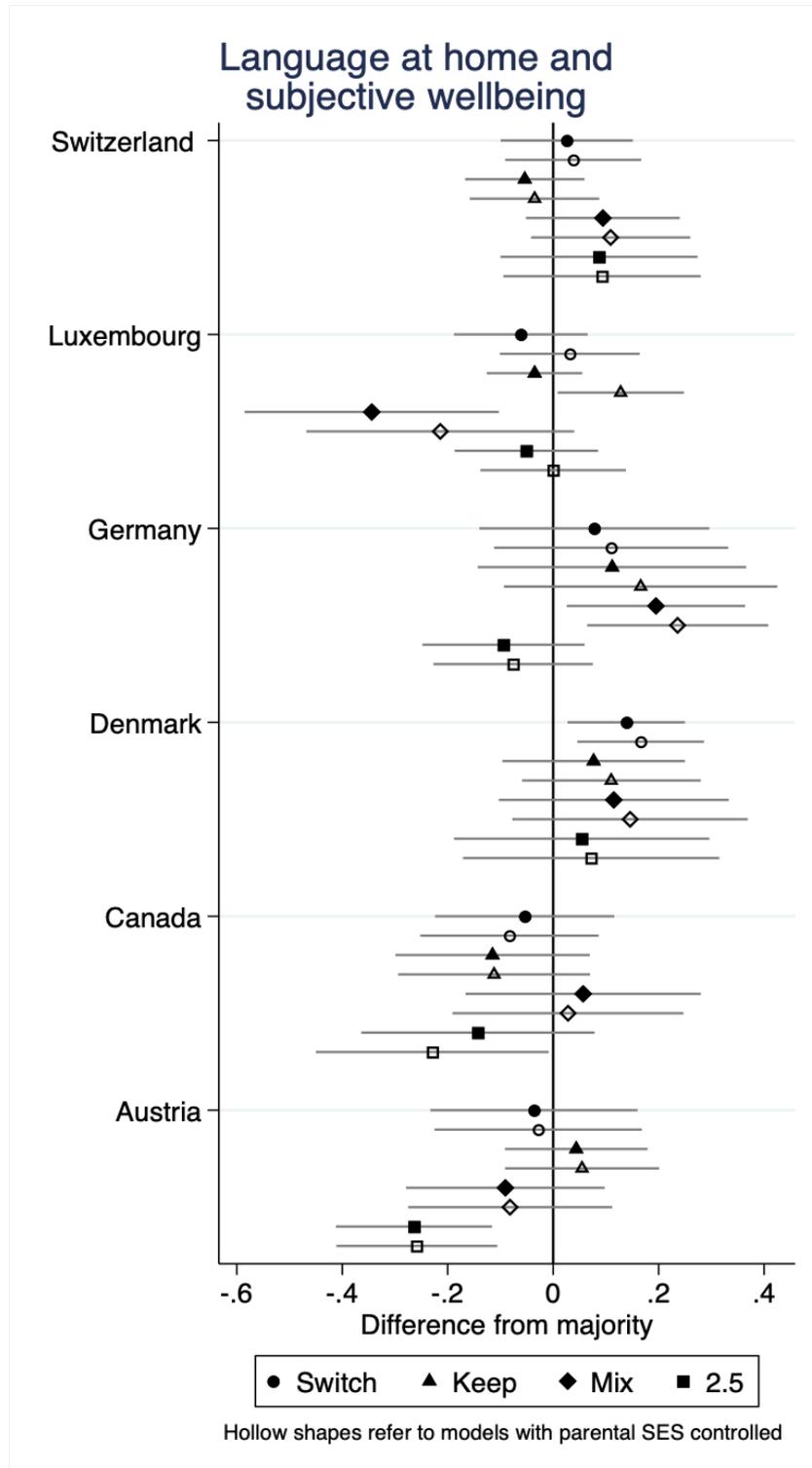


Figure 8. The estimated difference in subjective wellbeing of different immigrant-origin language groups from majority students across different countries, with and without controlling for parental SES (95% confidence intervals around estimates).



Discussion and conclusion

We have analysed how language spoken at home may be associated with the test scores, educational expectations, sense of belonging at school, and subjective wellbeing of children of immigrants. We have aimed to show how previous research – particularly that using the PISA – has in some cases produced results that are not entirely accurate, and that recommendations for immigrant parents to switch to using the language of the destination society have in many cases been made prematurely. One part of the problem is that different processes are at play when students do not speak the test/instruction language at home versus when students do not speak a national language at home. The relevance of this distinction differs from country to country, with it naturally being most accentuated in multilingual countries such as Belgium, Canada, Finland, and Luxembourg. In addition, comparisons need to be done within groups where language switching is a relevant question, preferably also taking into account how much of each language is actually spoken. Our first analyses replicating previous research found a negative association between speaking ‘another’ language at home and reading test scores across all the analysed countries, and this was not substantially attenuated by controlling for country of origin. However, when focusing on groups where we can ascertain that language switching is a relevant process – in contrast with arriving in the country already speaking the language of the destination country as a home language – these negative associations disappeared in a number of countries.

Our main results paint a more nuanced picture of the phenomenon; in most cases, the pattern of language use at home is not systematically associated with subjective wellbeing or educational expectations, though with some indications that continuing to speak the language of parental origin may be associated with higher educational expectations than switching the primary language spoken at home to that of the destination country. In contrast, in some countries, ‘switching’ is associated with a higher sense of belonging at school and, in a number of countries, with higher reading scores than continuing to speak the language of parental origin. Nevertheless, the reading scores of these groups of children of immigrants may still not be on a par with their majority peers’.

There is considerable variation in how patterns of language maintenance are associated with incorporation measures in different countries. Our results suggest that ‘keeping’ the first language is most disadvantageous in Finland, where it is associated with both lower reading scores and a lower sense of belonging. However, this is only a preliminary conclusion due to the small sample size from Finland. In other countries, ‘keeping’ is associated with either

lower reading scores (Austria, Luxembourg, and Switzerland, and possibly Greece and Germany) or a lower sense of belonging (Belgium and, less clearly, Denmark). Of the countries analysed, Australia, Canada, and New Zealand stand out as having no penalties for language ‘keepers’; in these countries, ‘keepers’ also have higher mathematics scores than ‘switchers’, and in Canada they also have higher science scores and higher educational expectations.

Our results thus suggest that the more classical (Anglophone) countries of immigration provide contexts where speaking different languages does not constitute a major barrier for incorporation, whereas in the newer (European) countries of immigration, non-national languages do constitute barriers in some form or another. In these contexts, families who choose (and are able) to switch to the language of the destination country seem to provide their children with better opportunities. However, we cannot say whether the associations are causal; better incorporation may lead to language switching or vice versa. It is also unknown whether it is parents who switch languages or if at some point children refuse to speak their first language with their parents.

The outcomes that are more clearly related to the personal and family sphere (positive affect, resilience, eudaimonia, and, to some extent, educational expectations) do not tend to be associated with language use at home. When looking at these outcomes, it seems that immigrant families make the choices that best suit their own families, in particular their children. However, with regard to the outcomes more clearly related to school (learning outcomes and sense of belonging at school), these choices are associated with different outcomes in different contexts. It is interesting to note how historically power-related language hierarchies may still be reflected in school contexts as ideologies that maintain monolingual norms; for example, in officially bilingual Belgium and Finland, national languages are still mainly kept separate from one another, which may be reflected in how new languages are perceived and tolerated at schools (see also Alisaari et al., 2019). This kind of bright boundary (Alba, 2005) shows as a difference in the sense of belonging at school in particular.

At the policy level, the findings related to learning outcomes seem to reflect the extent to which immigrant integration is supported in the education system (using the education index of the Migrant Immigration Policy Index [MIPEX], Solano & Huddleston, 2020), with the exception of Finland and partly Denmark. More specifically, Canada, Australia, New Zealand, and Belgium score highly in terms of having a comprehensive approach to

integration, and there is no gap in learning outcomes due to language spoken at home in these countries. Luxembourg, Switzerland, Austria, Germany, and Greece have relatively middling scores, and we do find learning gaps in these countries. In Denmark, MIPeX scores are also middling, but there is no language-related learning gap. Finland, on the other hand, scores highly in the MIPeX, but language differences are still evident, reflecting previous research on how Finland is supportive of multiculturalism at the policy level but not in practice (Saukkonen, 2013).

Overall, our results do not give considerable support to the segmented assimilation or the acculturation frameworks, although they do not completely refute them either. Additional analyses testing for interactions between family SES and language choices did not produce clear results that would have been expected based on the segmented assimilation theory. However, it was beyond the scope of this paper to take into account the strength of the co-ethnic community, which is also expected to be an important mediator of these relationships (e.g., Portes & Hao, 2004).

Teachers and schools play an important role in students' wellbeing and sense of belonging (Anderson & Graham, 2016; Borgonovi, 2018; Heikamp et al., 2020). Perceived equality from embracing students' diverse cultural backgrounds as a resource is positively associated with a higher sense of school belonging, which in turn has been associated with higher achievement and general life satisfaction (Schachner et al., 2019). The challenge in many countries seems to be the gap in learning outcomes between students who maintain their languages of origin and those who switch to using the language of instruction at home. This may be related to different orientations towards first languages and whether they are seen as a resource or a barrier for learning within schools. Moreover, of note is the finding that it is the students who mix languages at home who have the lowest reading scores in a number of countries. However, further investigation is still needed into these matters.

To conclude, a positive school climate is of particular importance in schools with vulnerable minority students, especially those from disadvantaged backgrounds (Berkowitz, 2020). Policies and practices that appreciate cultural and linguistic diversity should not only be set at the national level, they should also be negotiated by school staff and students to promote belonging and participation in the school community. Only in this way can all students experience a strong sense of belonging at school and equal learning opportunities, regardless of their backgrounds.

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Appendix

Table A1. Distribution of language-related variables within each country (% and N)

	LOTT	LOTN	N (1)	Keep	Mix	Switch	2.5 gen	Maj.	N (2)
Australia	13.0	12.6	12725	2.9	1.3	2.9	0.7	92.2	7601
Austria	20.3	20.3	6648	7.5	4.7	3.4	3.6	80.8	5480
Belgium	17.3	12.4	8107	3.1	1.2	1.4	2.6	91.7	5960
Canada	20.9	18.2	21391	5.4	2.1	4.9	0.9	86.8	14555
Denmark	7.9	7.8	7409	1.5	1.3	3.6	1.5	92.1	6012
Finland	7.4	5.7	5547	0.3	0.1	0.2	0.1	99.3	4835
Germany	17.0	17.0	4639	3.3	3.1	3.0	6.1	84.5	3532
Greece	6.2	6.2	6350	0.3	0.5	1.7	2.7	94.8	5075
Luxembourg	82.7	41.7	5062	36.0	2.7	9.9	9.1	42.3	3295
New Zealand	14.2	13.3	5999	4.4	0.8	1.6	0.3	92.9	3513
Switzerland	26.8	23.0	5675	12.8	7.0	7.4	4.9	68.0	3718

(1) For LOTT and LOTN

(2) For detailed categorical variable

Table A2. Countries of origin in final models (countries that do not share languages)

PISA country	Countries of parental birth included
Australia	China Vietnam
Austria	Former Yugoslavia Turkey
Belgium	Turkey Eastern Europe
Canada	China Pakistan Smaller numbers: Iran, Korea, Syria, UAE
Denmark	Iraq Somalia Turkey Smaller numbers: Afghanistan, Former Yugoslavia, Lebanon, Pakistan, Syria
Finland	Somalia
Germany	Turkey Smaller numbers: Former Yugoslavia, Poland
Greece	Former USSR Republics
Luxembourg	Former Yugoslavia Portugal Smaller numbers: Cape Verde, Italy
New Zealand	China Korea
Switzerland	Former Yugoslavia Portugal Smaller numbers: Spain, Turkey

Note: The way Former Yugoslavia is defined differs slightly from country to country and in some cases includes, for example, Albania.