Inequalities in the Luxembourgish Educational System: Effects of Language Proficiency on Math Performance Among Different Generations of Immigrant Students

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ABSTRACT

Research indicates students with immigrant background are disadvantaged in educational systems of the host country (e.g., OECD, 2018). In Luxembourg, roughly half of the school population has an immigrant background (Lenz & Heinz, 2018), and several studies indicate these students are considerably disadvantaged in terms of educational achievement levels (Hadjar et al., 2015, 2018).

Lower achievement may be partly due to difficulties related to displacement and settling of 1st generation immigrant students. Second and later generation students may however also experience disadvantages as they speak languages at home that are different from the two main languages of instruction (i.e., German and French), and their parents may be less familiar with the educational system and less able to provide support for their children (Alba & Foner, 2016). This may explain why educational inequalities persist; however little is known about the influence of language proficiency of different generations of immigrant students on their performance in other school subjects. Therefore, our poster focuses on the effect of generation after controlling for the effect of language on math competency. Using data from the Luxembourg School Monitoring Programme (Épreuves Standardisées) for the 2016 cohort of 9th grade students in the two main tracks of secondary school (n=4,339), we conduct regression analysis to investigate to what extent language proficiency in German and French mediates the effect of generational status on math performance. Data indicate that language proficiency in both German and French explains a significant proportion of variance in math performance. In addition, there is a generation effect, whereby 1st and 2nd generation immigrant students attain lower levels of math competency than students of the 3rd generation and native students (whereby the latter group includes 4th and later generations of immigrant students as well). Results are discussed in terms of social mobility and educational inequality.

BACKGROUND

Much has been written about the upward or downward social mobility of the so-called, "New Second Generation" in the United States. In Europe, this topic has only recently begun to take shape. In the context of Luxembourg; however, there is very little literature on this topic even though nearly 50% of its population is now of immigrant status. Though small in geography and population, Luxembourg hosts a diverse set of immigrant groups, continuously attracting economic and some political immigrants, most notably from Italy, the former Yugoslavia and Portugal. Each of these groups arrived at a specific socio-historical moment: Italians at the height of the steel industry, former Yugoslavians fleeing war, and Portuguese to meet construction and service industry needs. Consequently, Luxembourg as a truly multilingual and multicultural country makes for a fascinating microcosm to test and explore existing theories of immigrant integration and related issues. Moreover, Luxembourg's language situation as described by Horner and Weber (2008) is 'triglossic', meaning that since 1984 the country has three official languages: Luxembourgish, French and German. This presents yet another interesting aspect and source of variation, to explore and ascertain new understandings of previously described social phenomena.

Most countries, and certainly in the USA from which much of the cutting-edge research in this area originates, are de jure monolingual despite the linguistic heterogeneity of contemporary immigrant populations.

In many ways Luxembourg is an idyllic nation; one of economic and multicultural affluence striving to make right by its people, especially its school age population (Kollweller, 2007). Despite the efforts, however, certain groups appear to be falling behind. Large scale studies have repeatedly indicated educational inequalities (e.g., Boehm et al., 2016; Fischbach et al., 2016; OECD, 2016). More specifically, students with migration backgrounds attain lower learning outcomes, and are underrepresented in higher educational tracks (Hadjar et al., 2018; Lenz & Heinz, 2018; OECD, 2019). While these noted studies on Luxembourg are foundational, a more nuanced approach is necessary to better understand progress, or the lack thereof, among the various cohorts of immigrants found in Luxembourg.

Such an approach allows for investigating the extent to which improvement, stagnation, or decline is occurring among immigrant groups in terms of important indicators of social integration. That is, to what extent does the evidence support "straight-line assimilation" (Alba and Nee, 1997) versus "segmented assimilation" (Portes and Zhou, 1993)? The typical benchmarks of social integration are socio-economic status, geographic distribution, language attainment, and intermarriage (Gordon, 1964). In the current study, we look at language attainment and academic performance as a proxy, and precursor, for upward social mobility. Of particular interest are the cross-generational differences in language proficiency and math performance, and their interrelationship.

Plenty of important work has been done to understand the relationship between reading comprehension and math performance (e.g., Vista, 2013). Even efforts to disentangle the genetic versus environmental effects that link mathematics, word decoding and reading comprehension have been made (Harlaar et al. 2012). Nevertheless, there is little research on this topic in relation to immigrants, much less about immigrant generational difference in Luxembourg, specifically as it pertains to differentials in academic achievement and performance. As noted earlier, much is known about the general disadvantage among students with immigrant backgrounds, but how this disadvantage lingers, or not, in subsequent generations in the context of Luxembourg, is not yet known.

Therefore, in this study we investigate the influence of language proficiency - as measured by standardized reading comprehension exams in French and German - on math performance among various generations of immigrant students in Luxembourg. More specifically, our poster focuses on the math performance of different generations of students with migration background in relation to their language proficiency after controlling for specific demographic, socio-economic and systemic indicators.

RESEARCH QUESTIONS

- How and to what extent is language proficiency, as measured by ÉpStan reading comprehension in French and German, associated with math performance (also measured in ÉpStan)?
- How and to what extent is the relationship between language and mathematics retained after adding specific demographic, socio-economic and systemic indicators?

DATA & METHODS

ÉpStan Study 2016 – Grade 9

The "Épreuves Standardisées" (ÉpStan) are a school monitoring tool in Luxembourg that consist of written, although in some cases computer-based tests and questionnaires, that create a standardised record of competences in key school areas. More precisely, every year at the beginning of each new learning cycle of compulsory schooling, in grades 1, 3, 5, 7 and 9, the ÉpStan examine whether the educational goals from the previous learning cycle have been achieved by all students in the respective grade levels. Based on this data, the ÉpStan contribute to and help inform Luxembourg's education monitoring and research efforts (for additional information see www.epstan.lu).

For the current study, we only consider grade 9; and for ease of comparability, we exclude the pre-générale students who are often identified as experiencing learning difficulties and are presented with an alternative learning curriculum. Thus, we restrict our analyses to students enrolled in the two traditional scholastic tracks: *classique* and *générale* (n=4,339).

VARIABLES OF INTEREST

Immigrant Status: students were asked to indicate their own country of birth, their parents (if known), and their grandparents (both maternal and paternal, if known). By combining this information we are able to distinguish the following 4 categories of students: a) students born outside of Luxembourg (1st Generation); b) students born in Luxembourg with both parents & all known grandparents born outside of Luxembourg (2nd Generation); c) students born in Luxembourg and whose parents were also born in Luxembourg, but all known grandparents were born outside of Luxembourg (3rd Generation); and d) the set of students that were born in Luxembourg along with their parents and grandparents (Native group). These four categories of students constitute our Immigrant status indicator variable. (see Table 1).

Table 1. Definition of Immigrant Generation (main variable of interest).

	Self	Father	Mother	Father's Father	Father's Mother	Mother's Father	Mother's Mother
1st Gen.	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born
2nd Gen.	Native-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born
3rd Gen.	Native-Born	Native-Born	Native-Born	Foreign-Born	Foreign-Born	Foreign-Born	Foreign-Born
Native	Native-Born	Native-Born	Native-Born	Native-Born	Native-Born	Native-Born	Native-Born

Parent Place of Birth: students were asked about their parents' country of birth and for their grandparents' as well. Using only their parents' information, however, we categorize students by their parent's country of birth and create the following categories: Luxembourg, Portugal & Cape Verde, Italy, Balkans, other EU, and other non-EU. Note: the "Balkans" groups youths whose parents were born in Albania, Bosnia, Bosnia- Herzegovina, Croatia, Macedonia, Montenegro, or Serbia. The "other EU" category groups youths whose parents were born in Belgium, Germany, France, or Spain. The "other non-EU" includes students whose parents were born outside of the EU, mostly from Asian and African countries, but the groups are too small to breakout separately.

Language Spoken with Parent: students were asked to indicate what language they speak primarily with their parents (father and mother, separately) and with their grandparents (paternal father and mother, and maternal father and mother, separately). Using only the information regarding their parents, we categorize students by those that speak primarily: Luxembourgish, Portuguese, Italian, Albanian/Slavic, other EU language, and other non-EU language.

CONTROLS

Gender: students are asked to indicate whether they identify as female or male. For the analyses we create an indicator variable with 0 = male and female = 1.

Years of Age: is calculated using each student's year of birth. In the analyses we center it around the cohorts mean age and include it linearly. Consequently, the coefficient reflects the effect associated with being older or younger than the average age of the cohort.

Academic Track: is an indicator variable reflecting the effect associated with being in *classique* (academic track) relative to being in the *générale* (vocational track).

Number of Books: students are asked to indicate the number of books in their home. The response options are: 1 "0-10" 2 "11-25" 3 "26-100" 4 "101-200" 5 "201-500" 6 "500+". However, for our analyses we combine the first 3 categories to represent students in homes with 100 or less books; and we combine the last 3 categories to represent the students that live in home with more than 100 books. The resulting indicator variable is thus 0 "0-100" and 1 "101-500+".

Socioeconomic Index of Occupational Status (ISEI): is an index that captures and represents the income and educational attributes of occupations. More precisely, higher index values correspond to occupations with higher returns to education, while lower values correspond to occupations that do not remunerate education as well. See Ganzeboom and Treiman (2003) for description of its original construction.

OLS REGRESSION:

$$E[ÉpStanMathScore] = \beta_0 + \beta_1 ImmigGen_i + \beta_2 PoB\text{-}father_i + \beta_3 PoB\text{-}mother_i + \beta_4 ParLang\text{-}father_i + \beta_5 ParLang\text{-}mother_i + \beta_6 Gender_i + \beta_7 Track_i + \beta_8 Books_i + \beta_9 Age_i + \beta_{10} ISEI_i + e_i;$$

where the outcome is the predicted ÉpStan Math Scores; *ImmigGen* is the immigrant generational status of the student; *PoB* is the parents' place of birth, separately for father and mother; *ParLang* is the primary language spoken by the parents with the student at home, separately for father and mother; *Gender* is a self-reported dichotomous variable of the students sex; *Age* is the mean-centered age in years as of 2016 of students in the sample; *Track* is a dichotomous variable of the academic track the student is enrolled in — coded as Classique or Générale; *Books* is a dichotomous variable indicating whether the student reported living in a home with more or less than 100 books; and *ISEI* is a continuous variable representing the highest parental occupational status in the home.

The modelling strategy is guided by our primary research question as outlined above and thus aims to understand the relationship between the ÉpStan Math score and Immigrant Generational Status (ImmigGen) relative to the student's performance in French and German reading comprehension, net of associated factors. The regression results along with the standardised beta coefficients are presented in Table 2. The marginal effects are pictured in Figure 1, which includes a *Gen.Only* model that accounts for generational status alone.

REGRESSION ANALYSIS

Table 2. Investigating ÉpStan math performance on immigrant generational status, place of birth of parents, language spoken with parents, and ÉpStan reading comprehension scores in German (DE) and French (FR), net of controls for Grade 9, 2016.

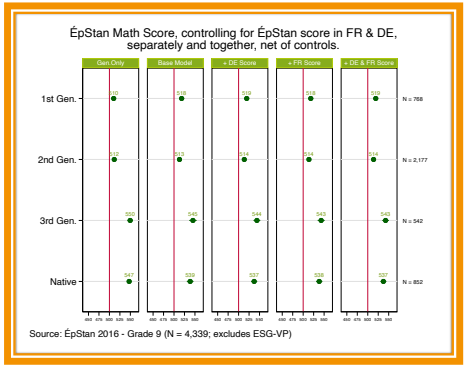
	(1) BASE MODEL Coef. / SE	β	(2) BASE+ DE SCORE Coef. / SE	β	(3) BASE+ FR SCORE Coef. / SE	β	(4) BASE + DE & FR Coef. / SE	β
Immigrant Generational Status:								
1st Gen.	5.097	0.023	5.847*	0.027	4.313	0.020	5.180	0.024
	(2.990)		(2.799)		(2.835)		(2.725)	
3rd Gen.	32.118***	0.126	30.167***	0.119	29.275***	0.115	28.427***	0.113
	(5.442)		(5.162)		(5.545)		(5.297)	
Native	25.692***	0.120	23.605***	0.111	24.340***	0.114	23.390***	0.110
	(5.505)		(5.093)		(5.231)		(4.995)	
Place of Birth of Father:								
Portugal / Cape Verde	10.264	0.055	12.422*	0.066	7.194	0.039	10.088*	0.053
	(5.370)		(6.066)		(5.045)		(4.768)	
Italy	5.449	0.011	12.731	0.025	5.304	0.011	11.123	0.022
	(9.169)		(8.375)		(8.724)		(8.331)	
Balkans	4.259	0.013	5.248	0.015	-2.151	-0.011	0.374	0.001
	(7.452)		(6.682)		(7.120)		(6.583)	
Other EU Countries	7.748	0.036	7.536	0.036	4.305	0.014	5.286	0.018
	(5.896)		(5.412)		(5.555)		(5.281)	
Other non-EU Countries	6.848	0.023	8.823	0.029	5.174	0.017	7.326	0.024
	(6.255)		(5.861)		(5.863)		(5.626)	
Place of Birth of Mother:								
Portugal / Cape Verde	10.861	0.057	9.158	0.048	8.583	0.045	8.044	0.043
	(5.690)		(5.349)		(5.493)		(5.342)	
Italy	17.315	0.026	12.794	0.019	11.795	0.018	10.279	0.015
	(12.405)		(11.318)		(11.334)		(10.241)	
Balkans	9.619	0.034	9.189	0.033	10.114	0.036	9.601	0.034
	(7.499)		(6.948)		(7.299)		(6.897)	
Other EU Countries	25.381***	0.084	23.153***	0.083	17.429**	0.063	19.348***	0.069
	(5.999)		(5.547)		(5.745)		(5.504)	
Other non-EU Countries	15.752*	0.055	13.576*	0.047	13.496*	0.047	12.576*	0.044
	(6.276)		(5.919)		(6.015)		(5.845)	
Language Spoken with Father:								
Portuguese	-0.450	-0.002	7.072	0.037	-5.994	-0.031	1.888	0.010
	(5.690)		(5.216)		(5.353)		(5.088)	
Italian	-16.024	-0.024	-5.278	-0.008	-19.478*	-0.030	-9.792	-0.015
	(10.087)		(8.853)		(9.429)		(8.448)	
Albanian/Slavic	-8.845	-0.026	-1.899	-0.006	-4.412	-0.013	-0.502	-0.001
	(9.752)		(9.156)		(9.442)		(9.139)	
Other EU Language	4.264	0.017	8.238	0.034	-6.592	-0.027	0.367	0.001
	(5.288)		(4.722)		(4.999)		(4.488)	
Other non-EU Language	5.081	0.014	9.949	0.028	3.705	0.010	9.336	0.027
	(8.383)		(7.364)		(7.943)		(7.259)	
Language Spoken with Mother:								
Portuguese	-5.394	-0.028	-0.721	-0.004	-11.001*	-0.057	-3.362	-0.020
	(5.439)		(5.139)		(5.425)		(5.259)	
Italian	-5.622	-0.008	2.634	0.003	-12.071	-0.017	-3.855	-0.005
	(10.889)		(10.397)		(10.862)		(9.894)	
Albanian/Slavic	5.209	0.015	4.869	0.014	7.335	0.022	6.279	0.018
	(10.017)		(9.455)		(9.765)		(9.469)	
Other EU Language	-4.960	-0.021	1.007	0.004	-16.925***	-0.071	-8.004	-0.033
	(5.388)		(4.997)		(5.064)		(4.861)	
Other non-EU Language	-5.452	-0.010	-0.331	-0.001	-7.434	-0.022	-3.571	-0.011
	(7.677)		(6.987)		(7.429)		(6.948)	
Controls:								
Female	-25.492***	-0.151	-26.988***	-0.160	-28.950***	-0.172	-28.918***	-0.172
	(2.066)		(1.916)		(1.962)		(1.876)	
Academic Track	72.278***	0.404	53.196***	0.297	46.606***	0.261	40.615***	0.227
	(2.650)		(2.541)		(2.678)		(2.596)	
Books@Home: 101+	20.637***	0.122	12.188***	0.072	16.862***	0.098	11.212***	0.067
	(2.364)		(2.175)		(2.231)		(2.138)	
Years of Age (centered)	-13.648***	-0.155	-8.398***	-0.095	-10.515***	-0.119	-7.455***	-0.085
	(1.144)		(1.065)		(1.094)		(1.046)	
Highest ISEI-08 of Parents (centered)	0.164*	0.033	0.111	0.023	0.064	0.013	0.038	0.012
	(0.073)		(0.069)		(0.070)		(0.067)	
ÉpStan: German Score			4.334***	0.372			4.243***	0.295
			(0.013)				(0.013)	
ÉpStan: French Score					4.300***	0.332	4.196***	0.255
					(0.014)		(0.014)	
Constant	481.634***		307.196***		351.454***		259.887***	
	(5.396)		(8.263)		(7.992)		(8.952)	
Adjusted R^2	0.354		0.448		0.425		0.473	
BIC	49099.377		48419.947		48615.292		48228.614	
DF	28		29		29		30	
Number of Cases	4,339		4,339		4,339		4,339	

* p < 0.05, ** p < 0.01, *** p < 0.001; (Robust standard errors in parentheses).

Source: Épstan 2016 - Grade 9

Note: Reference Groups: Immigrant Generation: 2nd Generation. *Place of Birth of Parent:* Luxembourg. *Language Spoken with Parent:* Luxembourgish. *Controls:* Male, Books@Home <=100, Vocational Track (ESST)

Figure 1. Math performance among various generations of immigrants



Source: ÉpStan 2016 - Grade 9 (N = 4,339; excludes ESG-VP)

Note: Model 1 (Gen.Only) includes Immigrant generation status only. Model 2 (Base Model) includes all covariates noted in Table 2 above. Subsequent models introduce reading comprehension scores separately and together, respectively. Reference Groups – *Immigrant Generation:* 2nd Generation. *Place of Birth of Parent:* Luxembourg. *Language Spoken with Parent:* Luxembourgish. *Controls:* Male, Books@Home <=100, and ES-Générale.

RESULTS

Model 1 (Base Model), accounts for all available demographic, socio-economic and systemic factors on Math performance. Model 2, 3 and 4 adds the student's performance in German reading comprehension, the student's performance in French reading comprehension, and both the German and French reading comprehension scores, respectively.

- Math performance and immigrant generational status is significant and positive for the 3rd generation and native student groups, relative to the 2nd generation reference category. The ÉpStan scores are scaled to a mean of 500 and a 100-point standard deviation; thus the statistically significant positive difference can be understood as a 32- and 25-point advantage for the 3rd generation and native group, respectively. In other words, these two groups, relative to the 2nd generation perform, on average, nearly one-third of a standard deviation higher. The association for the 1st generation group is positive, but not significantly different from the reference category. While the effect lessens across the various models, the basic magnitude and significance remains even after adjusting for reading comprehension scores, separately and in combination.
- By and large, the strongest effects are associated with the control variables, namely Academic Track and Gender. While the strength of the Academic Track effect decreases from about 40% to slightly less than 23%, as indicated by the beta (b) coefficient, after controlling for reading comprehension performance, the effect of Gender stays approximately the same (a disadvantage of at least 25-points for girls) across the models.
- Place of birth of parents is mainly unrelated to math performance, except that students with mothers born in neighbouring countries significantly outperform students with mothers born in Luxembourg by approximately 20-points. Language spoken with parents is mostly unrelated with Math performance. However, when the French reading comprehension score is added (Model 3), results indicate an 11-point and 17-point disadvantage for 9th graders who speak primarily Portuguese, or some other EU language, with their mothers, respectively.
- The Base Model accounts for approximately 35% of the variation around Math performance; Models 2 and 3, each account for an additional 7-9 percentage points, but in combination they account for an additional 12 points for a total of 47.3% of the variation. This is corroborated by the respective BIC score (see Raftery, 1995).
- **Overall, these results indicate that both German and French reading comprehension scores, separately and together, have additional predictive power on Math performance after controlling for demographic, socioeconomic and systemic factors. The association between math performance and language proficiency is independent of immigrant generational status (i.e., results are not indicative of a mediation effect).**

LIMITATIONS & CONCLUSION

- The relationship between math and language ability is well known to be a function of (g) general intelligence (Isphording et al., 2016). Nevertheless, Isphording et al. (2016) estimate that nearly 75% of the partial correlation between reading and math performance can be attributed to a causal effect of reading on math.
- While we can and do control for several important parent related factors, in 2016 ÉpStan did not collect parent's education, therefore these results do not account for this important correlate.
- For simplicity, we do not consider cross-generation families (i.e., intermarriage between an immigrant father or mother, with older generation or native person); however Kalmijn (2015) has found important related effects. We leave that issue for a future study.

Nevertheless, the results indicate systemic (i.e., school tracking) and demographic variables (especially gender) are strong predictors of mathematic performance among 9th graders in Luxembourg. In addition students with an immigrant background, especially 1st and 2nd generation immigrants, perform less well than later generations and native students. Moreover, language proficiency has an added effect on mathematical performance. Together, these results suggest that some students are (dis)advantaged in the educational system and hence certain student groups may experience reduced opportunity for social mobility.

REFERENCES

- Alba, R. and Nee, V. (1997). Rethinking Assimilation Theory for a New Era of Immigration. International Migration Review, 31(4):826–874.
- Alba, R., & Foner, N. (2016). Integration's challenges and opportunities in the Wealthy West. Journal of Ethnic and Migration Studies, 42, 3–22. https://doi.org/10.1080/1369183X.2015.1083770
- Allara, A. (2018). Educational Inequalities in Europe: Performance of Students with Migratory Background in Luxembourg and Switzerland. Number 440 in European university studies Series 23, Sociology; Lang, Frankfurt am Main. OCLC: 84577831.
- Allara, A., Hildebrand, V. A., and Van Kerm, P. (2018). How Does the Achievement Gap Between Immigrant and Native-Born Pupils Progress From Primary to Secondary Education? SSRN Electronic Journal.
- Anders, A., Thompson, C. G., and Becker, B. J. (2014). A quantitative synthesis of the immigrant achievement gap across OECD countries. Large-scale Assessments in Education, 2(1):7.
- Boehm, B., Lijen, S., Fischbach, A., Keller, U., & Leyhofen, D. (2016). PISA 2015 Nationaler Bericht Luxembourg. MENJE & University of Luxembourg.
- Buchmann, C. and Parrado, E. A. (2005). Educational achievement of immigrant-origin and native students: A comparative analysis informed by institutional theory. In International Perspectives on Education and Society, volume 7, pages 335–368. Emerald (MCB UP), Bingley.
- Chykina, V. (2018). Educational Expectations of Immigrant Students: Does Tracking Matter? Sociological Perspectives, 62(3):366–382.
- Crul, M., Lelie, F., and Keskiner, E. (2019). The Second and Third Generation in Rotterdam: Increasing Diversity Within Diversity. In Scholten, P., Crul, M., and van de Laar, P., editors, Coming to Terms with Superdiversity, pages 57–71. Springer International Publishing, Cham. Series Title: IMISCOE Research Series.
- Crul, M., Schneider, J., and Lelie, F., editors (2012). The European Second Generation Compared: Does the Integration Context Matter? IMISCOE research. Amsterdam University Press, Amsterdam.
- Crul, M. and Vermeulen, H. (2003). The second generation in Europe. The International Migration Review, 37(4):965–986.
- Dronkers, J. and Fleischmann, F. (2010). The Educational Attainment of Second Generation Immigrants from Different Countries of Origin in the EU Member-States. In Dronkers, J., editor, Quality and Inequality of Education, pages 183–204. Springer Netherlands, Dordrecht.
- Duncan, G. J., Ludwig, J., Ludwig, J., Sanbonmatsu, D., and McCurdy, C. A. (2016). Generational Differences in Academic Achievement Among Immigrant Youths: A Meta-Analytic Review. Review of Educational Research, 86(1):5–41.
- Dustmann, C., Frattini, T., and Lanzara, G. (2011). Educational Achievement of Second Generation Immigrants: An International Comparison. Discussion Paper 2011-25, NORFACE Migration.
- Fischbach, A., Ugen, S., & Martin, R. (2016). Bilanz nach zwei vollen Erhebungsjahren [Taking stock after two full assessment cycles]. In SCRIPT & LUCET (Eds.), PISA 2015 - Nationaler Bericht Luxembourg (pp. 15–19). MENJE.
- Ganzeboom, H. B. and Treiman, D. J. (2003). Three Internationally Standardized Measures for Comparative Research on Occupational Status. In Hoffmeyer-Zlotnik, J. H. and Wolf, C., editors, Advances in Cross-National Comparison: A European Working Book for Demographic and Socio-Economic Variables, Springer US, New York.
- Gordon, M. M. (1964). Assimilation in American life: The Role of Race, Religion, and National Origins. Oxford Univ. Press, New York, N.Y. 23. printing edition. OCLC: 247385519.
- Hadjar, A., Fischbach, A., & Backes, S. (2018). Bildungsungleichheiten im luxemburgischen Sekundarschulsystem aus zeitlicher Perspektive. In T. Lenz, I. Baumann, S. Ugen, & A. Fischbach (Eds.), Nationaler Bildungsbericht Luxembourg 2018 (pp. 59–81). University of Luxembourg, LUCET & MENJE/SCRIPT.
- Hadjar, A., Fischbach, A., Martin, R., & Backes, S. (2015). Bildungsungleichheiten im luxemburgischen Bildungssystem. In L. T. & J. Berteres (Eds.), Bildungsbericht Luxemburg 2015, Band 2 (pp. 34–55). MENJE/SCRIPT & University of Luxembourg.
- Harlaar, N., Kovas, Y., Dale, P. S., Petrill, S. A., and Plomin, R. (2012). Mathematics is differentially related to reading comprehension and word decoding: Evidence from a genetically sensitive design. Journal of Educational Psychology, 104(3):622–635.
- Horner, K. and Weber, J.-J. (2008). The Language Situation in Luxembourg. Current Issues in Language Planning, 9(1):69–128.
- Isphording, I. E., Piopiunik, M., and Rodriguez-Planas, N. (2016). Speaking in numbers: The effect of reading performance on math performance among immigrants. Economics Letters, 139:52–56.
- Knight, J. R. and Hanja, C. H. (1977). Math Language Ability: Its Relationship to Reading in Math. Language Arts, 54(2):423–428.
- Kollweiler, S. (2007). Immigration in Luxembourg: Nine Challenges for an Old Country. Technical report, Migration Information Source, Washington, D.C. ISSN 1946-4037.
- Lenz, T., & Heinz, A. (2018). Das Luxemburgische Schulsystem: Einblicke und Trends. In T. Lentz, I. Baumann, & A. Klopper, (Eds.), Nationaler Bildungsbericht Luxemburg 2018 (pp. 22–34). Université du Luxembourg (LUCET) & SCRIPT.
- Portes, A. and Zhou, M. (1993). The New Second Generation: Segmented Assimilation and its Variants. The ANNALS of the American Academy of Political and Social Science, 530(1):74–96.
- OECD. (2016). PISA 2015 Results in Focus (Volume I). In Paris: Vol. I. https://doi.org/10.1787/9789264266490-en
- OECD. (2018). Equity in education: Breaking down barriers to social mobility (PISA). OECD Publishing. https://doi.org/10.1787/9789264073234-en
- OECD. (2019). PISA 2018 results (Volume I): What students know and can do. In OECD Publishing. OECD Publishing. https://doi.org/10.1787/5f07c754-en
- Raftery, A. E. (1995). Bayesian Model Selection in Social Research. Sociological Methodology, 25:111.
- Thomson, M. and Crul, M. (2007). The second generation in Europe and the United States: How is the transatlantic debate relevant for further research on the European second generation? Journal of Ethnic and Migration Studies, 33(7):1025–1041.
- Vista, A. (2013). The role of reading comprehension in maths achievement growth: Investigating the magnitude and mechanism of the mediating effect on maths achievement in Australian classrooms. International Journal of Educational Research, 62:21–35.

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