המכון להגירה ושילוב חברתי
The Institute for Immigration and Social Integration
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STEM Outcomes of Second-Generation Israeli Immigrant Students with High-Skilled Parental Backgrounds

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Dr. Svetlana Chachashvili-Bolotin

- Senior Lecturer and Researcher at Ruppin Academic Center in Israel
- Ph.D. in sociology from Tel Aviv University: educational inequality among immigrants
- Has been teaching since 2000
- Worked at the Ministry of Education of Israel
- Immigrated to Israel in 1991

Ruppin Academic Center's Focus

- Marine sciences

- Immigration and social integration
  - The Institute for Immigration and Social Integration (IISI)
  - MA in Immigration and Social Integration

- Entrepreneurship and social involvement

The 6th Ruppin International Conference on Immigration and Social Integration | May 18-20,2020

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The 6th Ruppin International Conference on Immigration and Social Integration

Migration and Diasporas

18/05/2020 08:30 , Ruppin Academic Center campus

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Link to the conference:
https://www.ruppin.ac.il/en/Events/International-Conference-on-Immigrationand-and-Social-Integration/Pages/default.aspx

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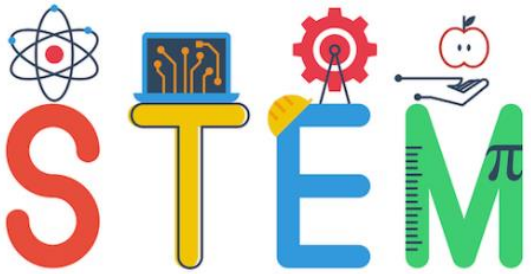
STEM Outcomes of Second-Generation Israeli Immigrant Students with High-Skilled Parental Backgrounds

- Why STEM Outcomes?

- Why Second-Generation Immigrants?

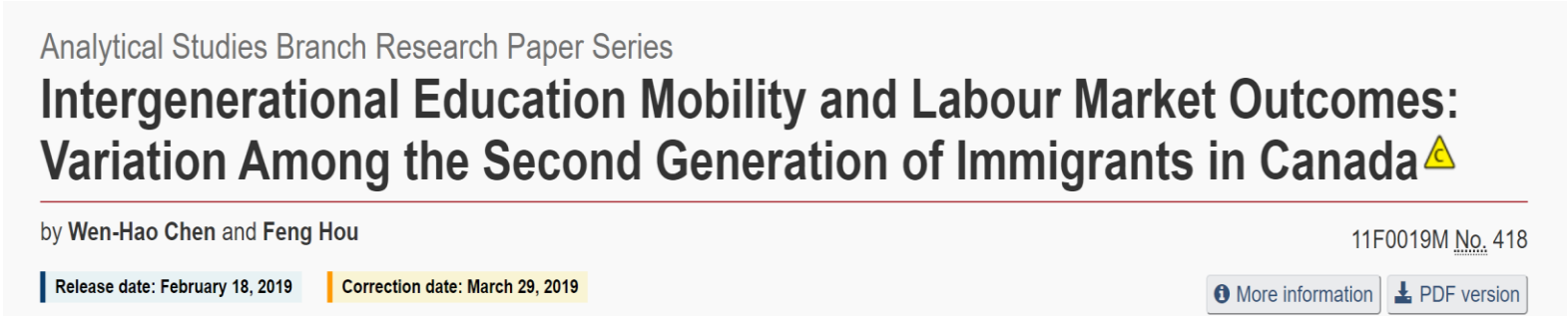
Why STEM outcomes?



- Shortage of STEM-related professionals
- Offer higher financial payoffs
- May function as an economic safety-net
- Transferable between national contexts
- Lack of language proficiency

*Ostensibly, **STEM careers** are especially relevant for **immigrants***

Why Second-Generation Immigrants?



Analytical Studies Branch Research Paper Series

Intergenerational Education Mobility and Labour Market Outcomes: Variation Among the Second Generation of Immigrants in Canada

by **Wen-Hao Chen** and **Feng Hou**

11F0019M No. 418

Release date: February 18, 2019 **Correction date: March 29, 2019**

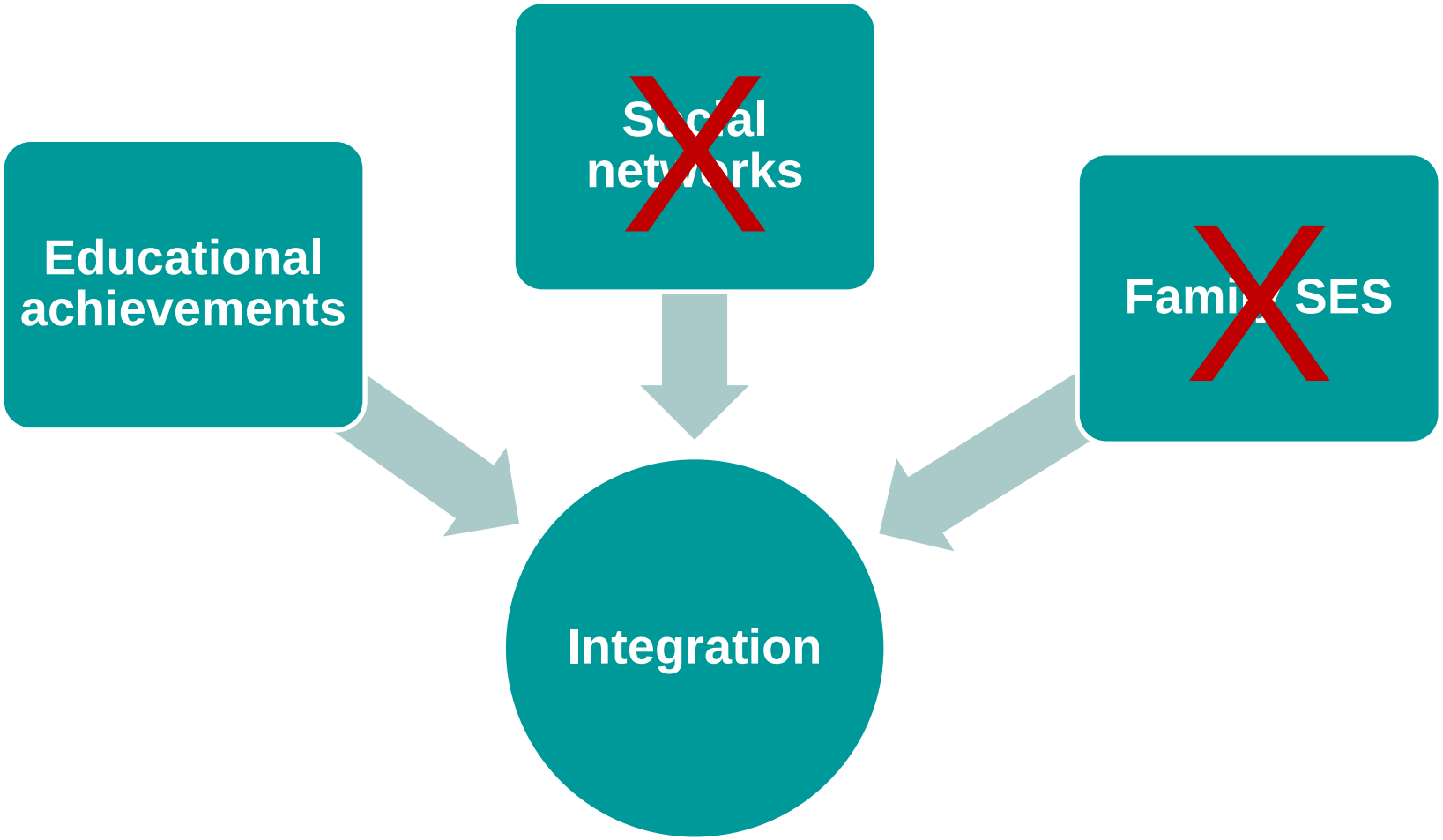
More information PDF version

1 Introduction

The second generation of immigrants—individuals who were born in Canada to at least one immigrant parent—constitutes a large component of the Canadian population. According to the 2016 Census, about 6.1 million Canadians are second generation. In 2016, the second generation made up 27% of the nation's population younger than 25 and 16% of the population aged 25 to 44. Since the members of the second generation were raised and educated in Canada, common labour market barriers that adult immigrants often face, such as language or foreign credential recognition, do not apply to them. Therefore, the socioeconomic outcomes of the second generation, particularly in comparison with those of individuals with two Canadian-born parents, can shed light on the long-term integration of immigrant families from diverse socioeconomic and cultural backgrounds.

Chen, W. H., & Hou, F. (2019). Intergenerational Education Mobility and Labour Market Outcomes: Variation among the Second Generation of Immigrants in Canada. Analytical Studies Branch Research Paper Series. *Statistics Canada*.

Immigration, Education, and Integration



Immigration, Education, and Integration

The manner in which immigrants fit into the various levels of the education system is a significant indicator of how they will integrate into the society as a whole in the future.

Current Research

- To examine between-group differences in Israeli high school **STEM enrollment** and **average grades in STEM track** between five ethnic groups of **Israeli-born** Jews

- To provide policy recommendations to support successful immigrant integration in a target society

My collaborators:

Dr. Sabina Lissitsa, Ariel University, Israel
Dr. Marina Milner-Bolotin, UBC, Canada

Israeli Background

Area

• Total	20,770–22,072 km^2 (8,019–8,522 sq mi)[a] (150th)

Vancouver Island

Geography	
Location	Pacific Ocean, on Canada's southern west coast.
Coordinates	49°30′N 125°30′W[1]
Area	31,285 km^2 (12,079 sq mi)

Israel

- Israel is an immigrant country founded in 1948

Over 3.3 million people immigrated to Israel since 1948

- "The **Law of Return** gives **people of Jewish ancestry and their spouses** the right to immediate citizenship".

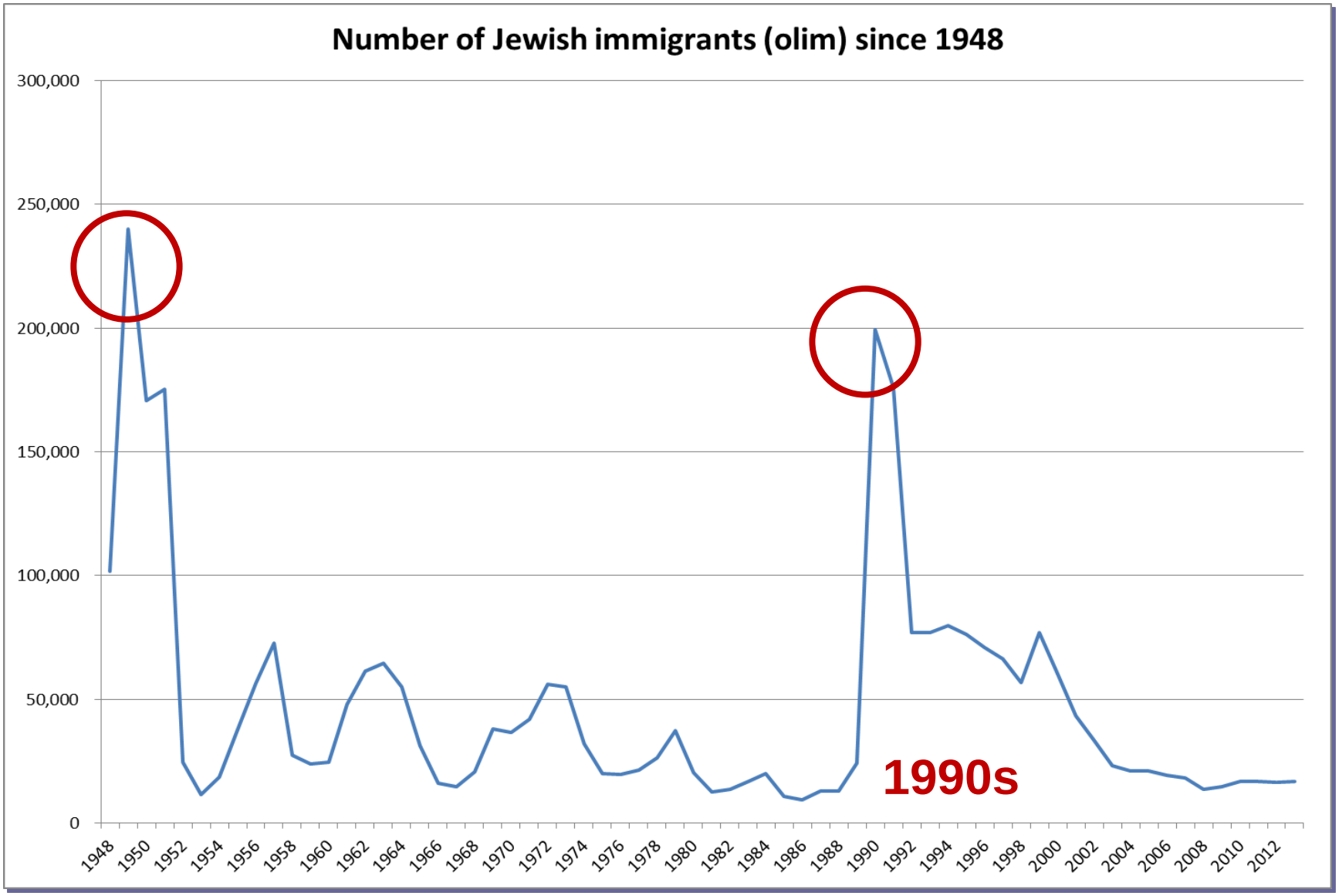
Of Israel's ~9 million citizens, about 75% are Jews (or of Jewish ancestry) and the remainder are non-Jews (mostly Muslim Arabs).

Demographic Overview

	Jews	Arabs	Total
1948	600,000	156,000	756,000
2018	6.6 million	1.8 million	8,8 million

Seventy years after the foundation of the state of Israel, the size of the Israeli population has increased more than **ten-fold.**

Most Jewish population is composed of immigrants or offspring of immigrants who immigrated from more than 130 countries. Most Arab citizens were born in Israel.


Number of Jewish immigrants (olim) since 1948
300,000
250,000
200,000
150,000
100,000
50,000
0
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
1990s

Israeli Education System

- Ministry of Education – Nationwide curriculum
- Division by sector: Jewish and Arab sectors
- Grades 10-12 constitute high school
- During high school, most students take national final examinations, compulsory in both core and elective subjects
- Compulsory core and elective subjects can be studied at various difficulty levels

Science Education in Israeli High Schools

- **Mathematics** is a compulsory subject; science subjects are optional
- **Advanced math** provides accessibility to prestigious tertiary education
- **Studying advanced math and science** brings advantages to those wishing to major in prestigious fields
- **Advanced math and science subjects** are prerequisites for STEM tertiary education

STEM track - Math and Physics learning in Israeli high schools

- **Physics** also has a long tradition of being perceived as the most difficult subject among science subjects.
- **STEM track** is the combination of studying both mathematics and physics at an advanced level in high schools.
- **STEM track is perceived** as one of the most prestigious and difficult academic tracks.

Research Objective

- To examine between-group differences in Israeli high school **STEM enrollment** and **average grades** in STEM track between five ethnic groups of **Israeli-born** Jews.

Four of these groups comprise **second-generation immigrant students,** whose parents have high-skilled background, and the fifth group is **non-immigrant background students.**

Four high-skilled immigrant groups

- Immigrants from **South America (SA)**
- Immigrants from **North America (NA)**
- Immigrants from **France**
- Immigrants from the **Former Soviet Union (FSU)**

Educational and Labor Market Characteristics of Groups

	STEM-related occupation	% of Academic Education holders	Gross Annual Income from work (NIS)
Immigrants from France	21.5%	42.5%	119,957.3
Immigrants from NA	24.8%	**63.4%**	**153,195.5**
Immigrants from SA	23.1%	45.1%	129,333.9
Immigrants from the FSU who immigrated between 1989-1995	**30.5%**	43.2%	**101,929.3**
Israeli-born Jews	17.3%	32.0%	130,426.2

Israeli citizens born in 1955-1977 – population census 2008, CBS, Israel

Theoretical Background

- Segmented Assimilation Theory (Portes & Rumbaut)

- Theoretical concepts based on the works of Bourdieu: “habitus” and “cultural capital” - “science habitus” and “science cultural capital”

Hypotheses regarding **enrollment** in STEM track	Theoretical background
H1: The non-immigrant background students **will not have** an advantage in **STEM track enrollment**, as compared to the second-generation immigrant students from high-skilled groups	Segmented Assimilation Theory
H3: NA students **will be more** likely, and FSU students **will be less** likely, to **enroll in the STEM track**, as compared to other groups	Segmented Assimilation Theory
H5: FSU students **will be more likely** to **enroll in the STEM track**, as compared to other groups	Bourdieu's concepts

Hypotheses regarding **grades** in STEM track	Theoretical background
H2: Non-immigrant background students **will not have** higher **average STEM grades**, as compared to the second-generation immigrant students from high-skilled groups	Segmented Assimilation Theory
H4: NA students will have **the highest STEM grades** and FSU students will have **the lowest**, as compared to the other groups	Segmented Assimilation Theory
H6: FSU students **will have** higher STEM grades, as compared to the other groups	Bourdieu's concepts

Methods – Data

- Database of the Ministry of Education, which includes data on all students
- Parent-reported information on student background variables (from the school registration)
- The study database includes **all Israeli-born Jewish students** who earned **their matriculation certificate during 2014-2017** and whose parents were born in FSU, NA, SA, France or Israel

Variables

Dependent variables:

- ***Enrollment in STEM track* (math and physics at the advanced level)**
- ***Average grades in STEM track***

Variables

Independent variable

- ***Ethnic origin*:**

Second generation of **NA** immigrants

Second generation of **SA** immigrants

Second generation of **FSU** immigrants

Second generation of **France** immigrants

Non-immigrant background Israeli-born Jews - a comparison group.

Variables

Control variables:

- **Student variables** (gender, mother’s/father's education, number of siblings)

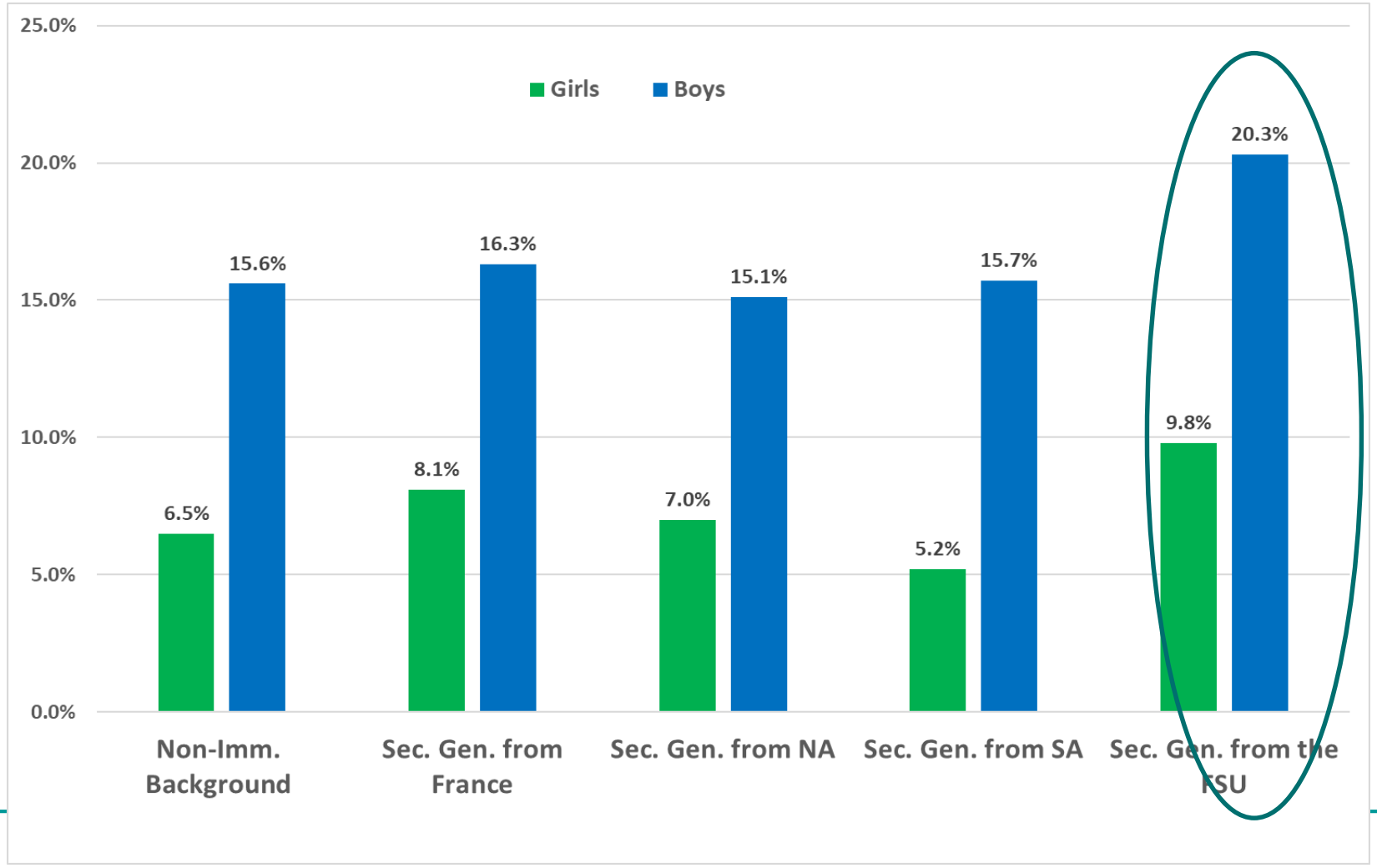
- **School variables** (type of school, the number of students in 12th grade, the percentage of boys at school, and the average percent of matriculation eligibility)

Study Population- a matriculation certificate holders in 2014-17

	Non-Imm. Group	S-G Imm. France	S-G Imm. NA	S-G Imm. SA	S-G Imm. FSU	Total
N	149,881	983	1,465	1,138	20,169	173,636
%	86.3%	0.6%	0.8%	0.7%	11.6%	100%
Level of education among mother						
Post-secondary	**7.2%**	13.8%	5.5%	7.6%	44.0%	11.5%
Tertiary	**41.6%**	53.4%	**77.7%**	65.6%	39.1%	41.9%

Study Findings

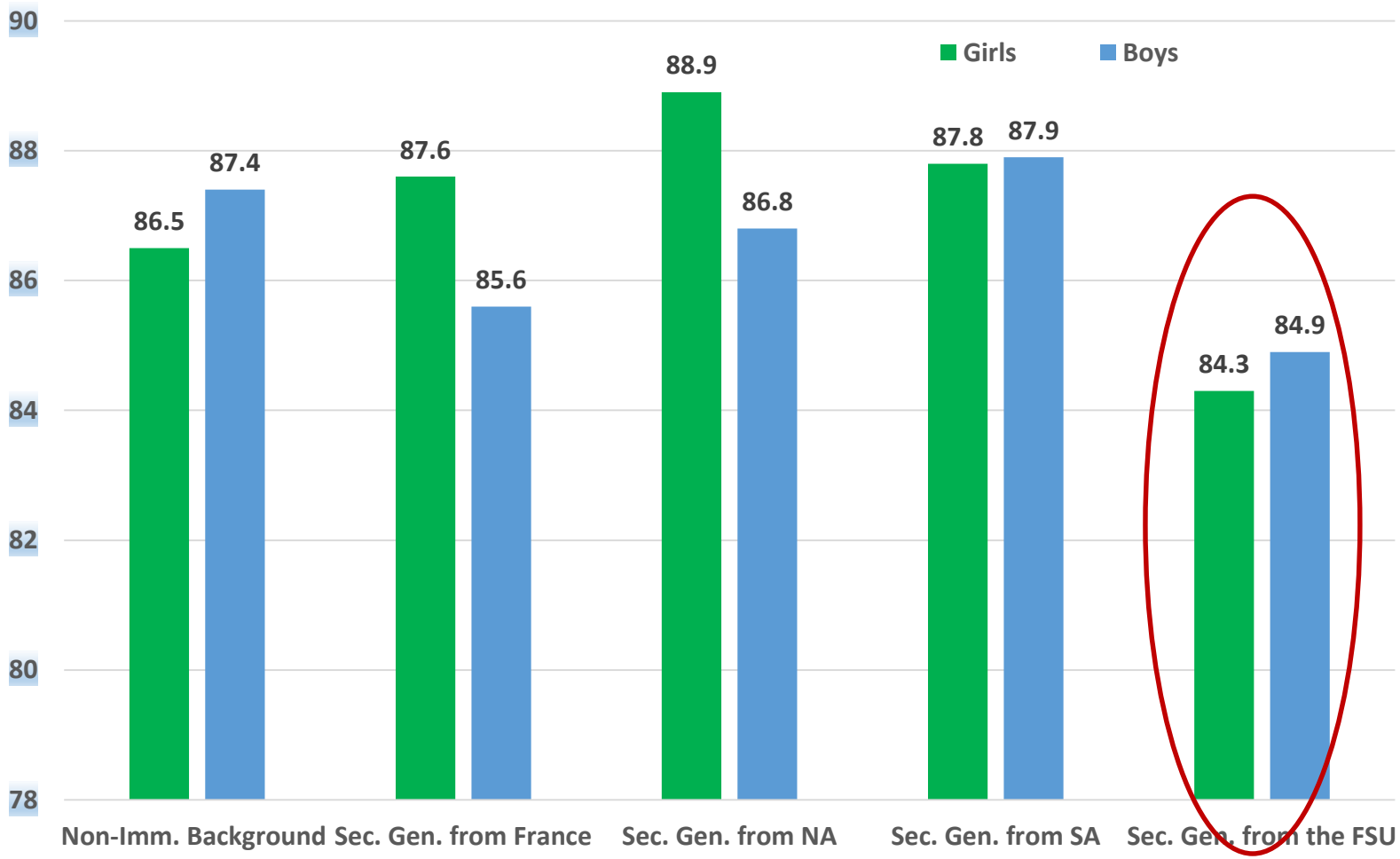
STEM Track Enrollment by Gender and Ethnic Group



STEM Track Enrollment

Hypotheses	Theoretical background	Supported/Partial supported/Not-supported
H1: The non-immigrant background students **will not have** an advantage in **enrollment in the STEM track**, as compared to second-generation immigrant students from high-skilled groups	Segmented Assimilation Theory	**Supported**
H3: NA students will be more likely, and FSU students will be less likely, to **enroll in the STEM track**, as compared to other groups	Segmented Assimilation Theory	Not supported
H5: FSU students will be more likely to **enroll in the STEM track**, as compared to other groups	Bourdieu's concepts	**Supported**

Grades in STEM Track by Gender and Ethnic Group



Grades in STEM Track

Hypotheses	Theoretical background	Supported/Partial supported/Not-supported
H2: Non-immigrant background students **will not have** higher **average STEM grades**, as compared to second-generation immigrant students from high-skilled groups	Segmented Assimilation Theory	Not supported
H4: NA students **will have** the highest **STEM grades** and FSU students will have the lowest, as compared to the other groups	Segmented Assimilation Theory	**Partially supported** (for FSU students only)
H6: FSU students will have higher STEM grades, as compared to other groups	Bourdieu's concepts	Not supported

Predicting Odds of Enrollment in STEM Track

	Model1		2Model	
Model Term	**B**	**Exp (B)**	**B**	**Exp (B)**
Intercept	-97.4**	0.00	-98.8**	0.00
Student variables				
Year of graduation	0.05**	1.05	0.05**	1.05
Gender (*girls=1, boys = 0)*)	-0.45**	0.64	-0.44**	0.64
Immigrant groups (compared to Non-Immigrant background students)				
FSU students	**0.19****	1.21	**0.18****	1.19
NA students	0.00	1.00	**-0.14***	0.87
French students	0.06	1.06	0.01	1.01
SA students	-0.03	0.97	**-0.17***	0.84
Number of siblings			0.01*	1.01
Mother/Father education (compared to secondary education)				
Father Tertiary educ.			**0.38****	**1.46**
Mother Tertiary educ.			**0.24****	**1.28**
Father Post-secondary educ.			0.13**	1.13
Mother Post-secondary educ.			0.00	1.00
Father missing education			0.01	1.01
Mother missing education			0.11**	1.11
School variables				
Type of school *(State religious school=1, state secular school = 0)*			-0.16**	0.85
% of matriculation certificate			**0.88****	**2.40**
Number of 12th grade students			0.00	1.00
Random effect covariance	1.15		1.11	

Predicting Average Grades in STEM Track

	Model1		2Model	
Model Term	B	Std. error	B	Std. error
Intercept	-4.85	123.55	-58.50	120.08
Student variables				
Year of graduation	0.05	0.06	0.06	0.06
Gender (*girls=1, boys = 0)*)	-0.82**	0.15	-0.82**	0.14
Immigrant groups (compared to Non-Immigrant background students)				
FSU students	**-2.39****	0.19	**-2.08****	0.20
NA students	0.45	0.76	-0.22	0.74
French students	-0.69	0.88	-0.98	0.86
SA students	0.75	0.88	0.13	0.85
Number of siblings			-0.16**	0.06
Mother/Father education (compared to secondary education)				
Father Tertiary educ.			2.44**	0.20
Mother Tertiary educ.			1.92**	0.20
Father Post-secondary educ.			0.59**	0.25
Mother Post-secondary educ.			-0.17	0.28
Father missing education			0.89**	0.44
Mother missing education			2.12**	0.49
School variables				
Type of school *(State religious school=1, state secular school = 0)*			0.23	0.23
% of matriculation certificate			14.02**	0.88
Number of 12th grade students			0.01**	0.00
Random effect covariance	44.96		41.99	

Discussion

Part 1: Educational choice

- The high **socio-economic family background** is insufficient to sustain the high enrollment in the STEM track

- Students from groups with higher level of **science habitus families** are more likely to enroll in the STEM track

Discussion

Part 2: Educational achievements

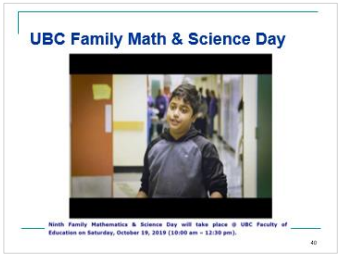
- **Science cultural capital when lacking economic means** is insufficient to guarantee the highest STEM achievements

Thus, ***both Segmented Assimilation Theory and Bourdieu's concepts of habitus and cultural capital*** *should be integrated in order to explain STEM outcomes*

Practical Implications

*What can be done for the students **with the potential** to succeed in STEM studies, who come from educated families, but who lack science habitus?*

- ***School-based STEM enrichment activities and social environments** can be used to inform **adolescents and their parents** about STEM-related occupational areas, especially those lacking a science habitus*



UBC Family Math & Science Day

Ninth Family Mathematics & Science Day will take place @ UBC Faculty of Education on Saturday, October 19, 2019 (10:00 am – 12:30 pm).

Conclusion

- A big impact can be made with relatively small investment into ***STEM enrichment activities for students, their parents and social environments***

Thanks to My Collaborators

Dr. Sabina Lissitsa

Ariel University
Communication Faculty

Dr. Marina Milner-Bolotin

UBC University
Faculty of Education
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Thank you!

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