



Students' expectations:
vocational interests, ambition, trends

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Introduction



- Focus = PISA question
 - ✓ “What kind of job do you expect to have when you are about 30 years old?”
- Not in-depth studied
 - ✓ Place in questionnaire framework ?
 - ✓ Evident interest for educational and vocational guidance
- 3 axes :
 - ✓ **Vocational interests**
 - ✓ Ambition
 - ✓ Trends



Data description

Data

- Countries :
 - ✓ PISA 2006 : 56 countries
 - ✓ PISA 2003 : 24 countries
 - ✓ PISA 2000 : 43 countries (39 in common with 2006)
- Job expectations coded in ISCO (International Standard Classification of Occupations) :
 - ✓ classification of jobs into a set of groups according to the tasks and duties undertaken in the job
 - ✓ 1988, updated in 2008

ISCO

1digit	DESCRIPTION	Examples
1	LEGISLATORS, SENIOR OFFICIALS & MANAGERS	Large/Small Enterprise Managers, Military Officers
2	PROFESSIONALS	Engineers, Medical doctors, Lawyers, Teachers
3	TECHNICIANS AND ASSOCIATE PROFESSIONALS	Computer Assistants, Nurses, Bookkeepers,
4	CLERKS	Secretaries, Cashiers, Telephone Operators
5	SERVICE WORKERS & SHOP & MARKET SALES WORKERS	Waiters, Child-care workers, Hairdressers, Salespersons, Policemen
6	SKILLED AGRICULTURAL & FISHERY WORKERS	Farmers, Gardeners
7	CRAFT ETC TRADES WORKERS	Carpenters, Plumbers, Butchers
8	PLANT & MACHINE OPERATORS & ASSEMBLERS	Knitting Machine Operators, Drivers
9	ELEMENTARY OCCUPATIONS	Building Caretakers, Labourers in Construction
-	OTHER	Housewife, Student, Social beneficiary Do not know, Vague, Missing

ISCO & ISCED

1digit	DESCRIPTION	ISCED
1	LEGISLATORS, SENIOR OFFICIALS & MANAGERS	5-6 (tertiary education)
2	PROFESSIONALS	5a-6 (first stage theoretically oriented and second stage tertiary education)
3	TECHNICIANS AND ASSOCIATE PROFESSIONALS	5b (first stage practically oriented tertiary education)
4	CLERKS	2-3-4 (secondary & post-secondary education)
5	SERVICE WORKERS & SHOP & MARKET SALES WORKERS	2-3-4 (secondary & post-secondary education)
6	SKILLED AGRICULTURAL & FISHERY WORKERS	2-3-4 (secondary & post-secondary education)
7	CRAFT ETC TRADES WORKERS	2-3-4 (secondary & post-secondary education)
8	PLANT & MACHINE OPERATORS & ASSEMBLERS	2-3-4 (secondary & post-secondary education)
9	ELEMENTARY OCCUPATIONS	1 (primary education)
-	OTHER	

ISCO Hierarchy

22 Life science and health professionals

...

222 Health professionals (except nursing)

2221 Medical doctors

2222 Dentists

2223 Veterinarians

2224 Pharmacists

2229 Health professionals (except nursing) not elsewhere classified

...

51 Personal and protective services workers

...

513 Personal care and related workers

5131 Child-care workers

5132 Institution-based personal care workers

5133 Home-based personal care workers

5139 Personal care and related workers not elsewhere classified

« Non-response »

- In average, 24% of students' responses are missing (14% pure missing, 4% vague, 6% don't know)
- No apparent link with country characteristics
- But in a large majority of countries, non-respondents are :
 - ✓ more often boys, from lower social background, with lower achievement scores
- Dealing with non-response

First look

- Most frequently declared :
 - ✓ 4-digit (N=533) : Medical doctor (boys and girls), Lawyer, Hairdresser (girls), Athletes, sport persons (boys)
 - ✓ 3-digit (N=159) : Health professionals (boys and girls), Social science professionals & Writers, Creative or performing artists, Hairdressers (girls), Architects, engineers, etc. professionals (boys)

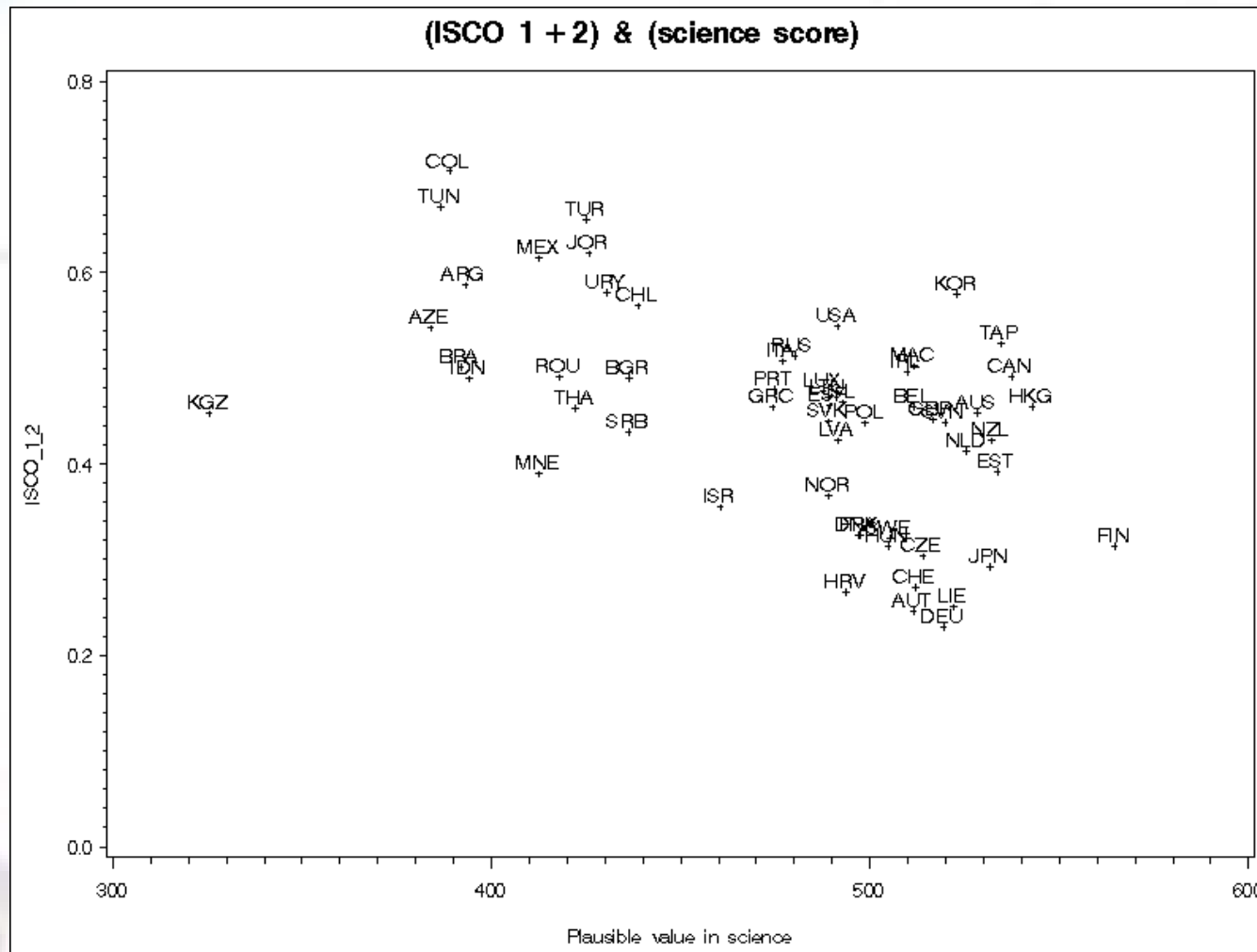
Country level

- PISA 2006 expectations (56 countries)

ISCO 1-digit	DESCRIPTION	MEAN	MIN	MAX
1	LEGISLATORS, SENIOR OFFICIALS & MANAGERS	6.1	1.1	13.8
2	PROFESSIONALS	38.9	18.8	61.3
3	TECHNICIANS AND ASSOCIATE PROFESSIONALS	13.0	3.0	26.8
4	CLERKS	2.0	0.1	11.1
5	SERVICE WORKERS & SHOP & MARKET SALES WORKERS	8.1	1.2	14.9
6	SKILLED AGRICULTURAL & FISHERY WORKERS	0.9	0.0	6.2
7	CRAFT ETC TRADES WORKERS	5.7	0.5	13.1
8	PLANT & MACHINE OPERATORS & ASSEMBLERS	1.1	0.1	9.6
9	ELEMENTARY OCCUPATIONS	0.3	0.0	2.2
-	OTHER	23.8	7.5	52.9

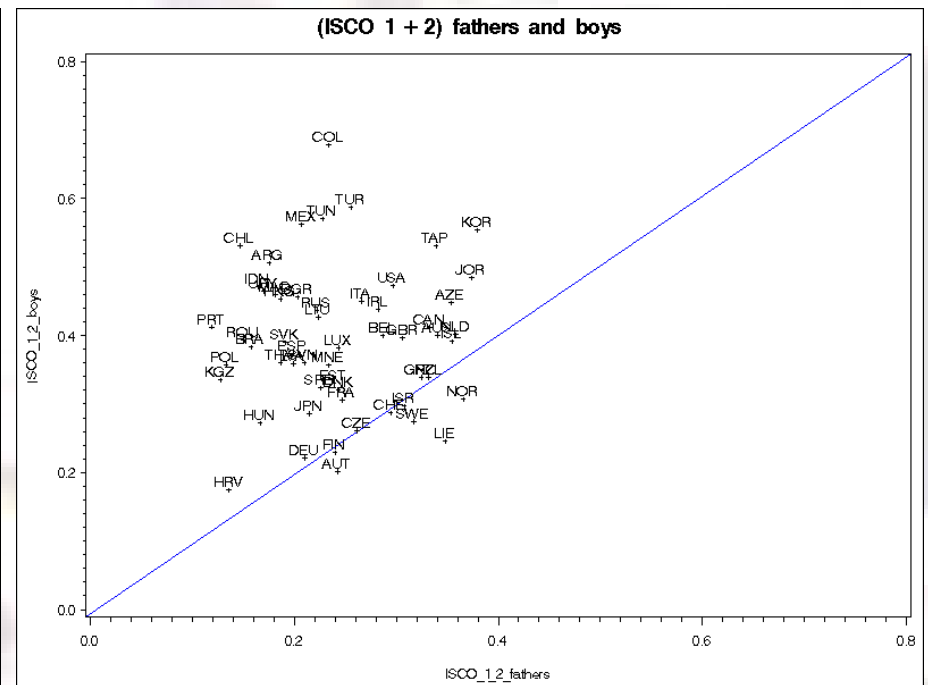
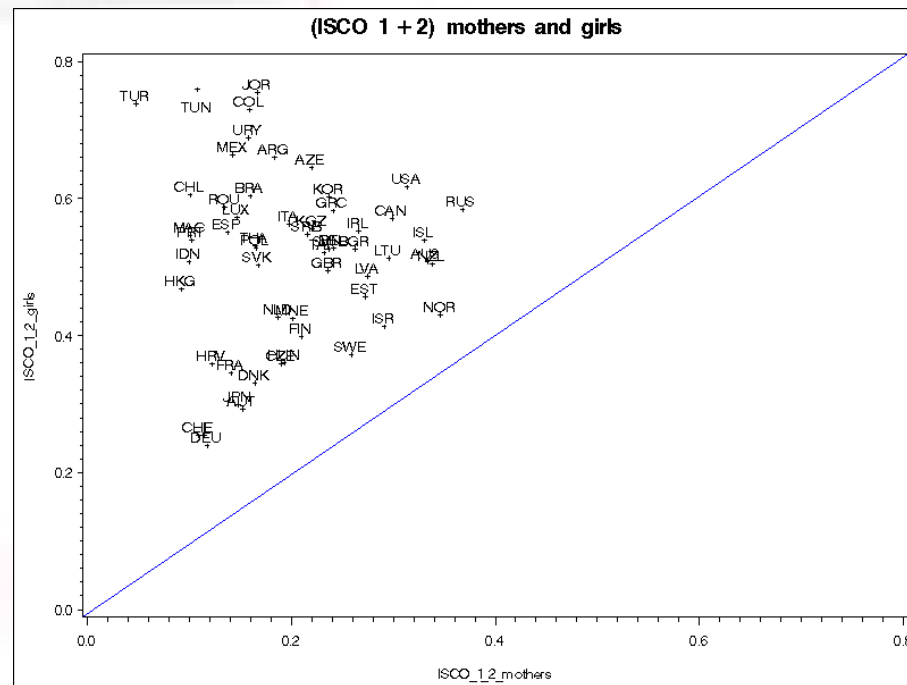
Country level

- PISA 2006 expectations and performance



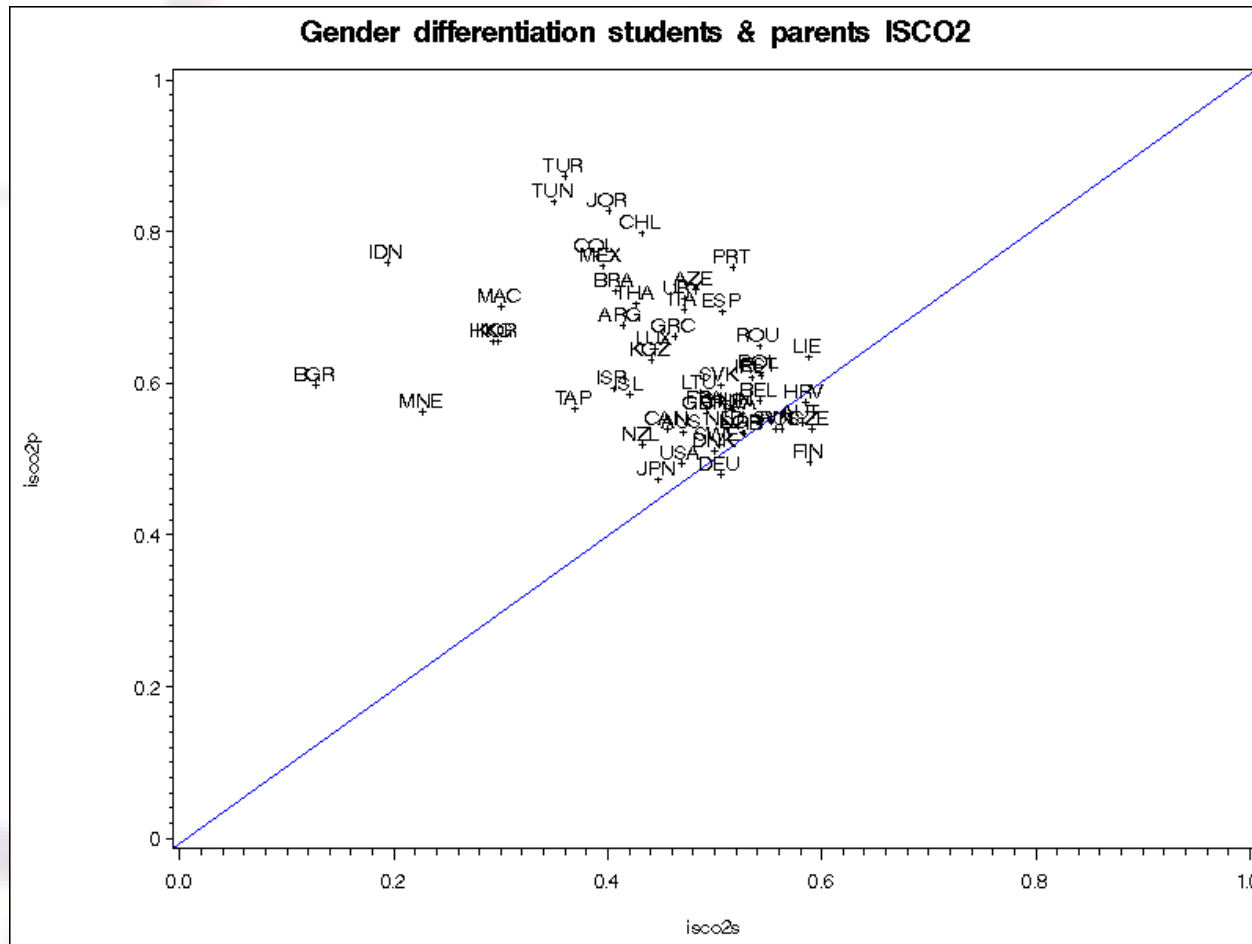
Country level

- Students' expectations and parents' occupations
 - ✓ Individual level
 - ✓ Country level



Gender differentiation

- Strength of gender differentiation of occupations :
 - ✓ Parents' occupations > students' expectations





Vocational interests

Holland's vocational interests model

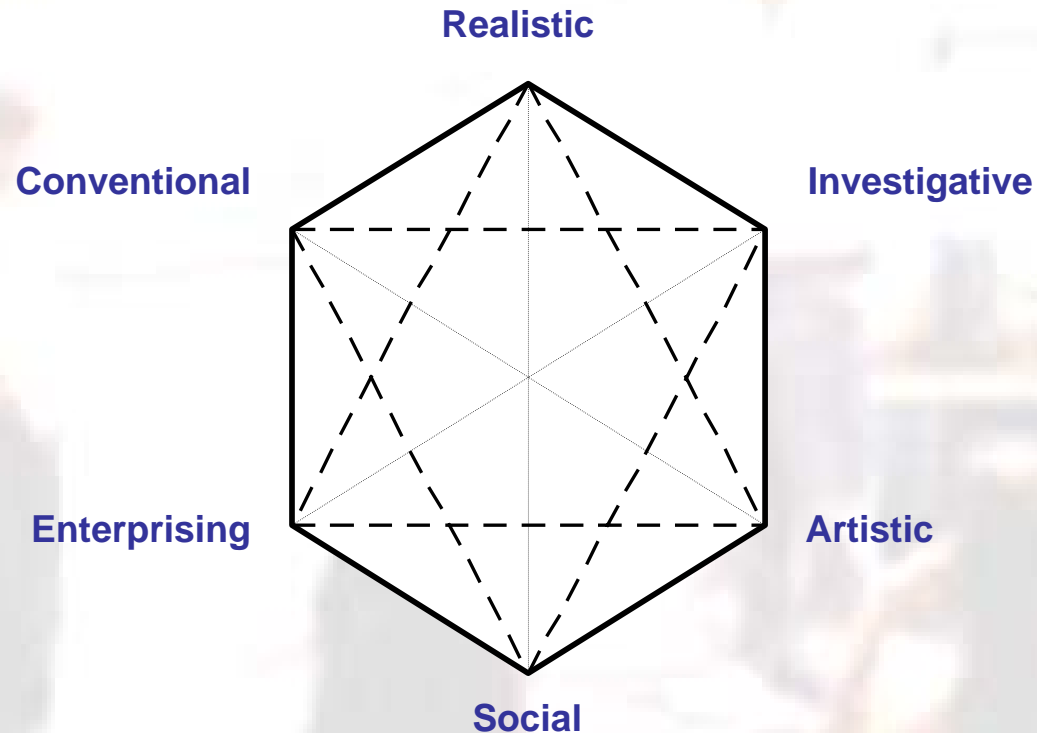
- John Holland (first edition :1966, 4th : 1992) : *The psychology of vocational choice. A theory of personality types and model environments*
- Interests :
 - ✓ Psychological variables explaining vocational choices / representing activities preferences
- A typology for :
 - ✓ Personality traits
 - ✓ Activities
 - ✓ Work environment
 - ✓ Occupations
- A lot of publications in the field of vocational psychology
- Importance :
 - ✓ Theoretically (model of personality)
 - ✓ Practically (congruence : fitting personality and work environment, tool for guidance counselors)

RIASEC

Type	Short description (O*NET)	Examples
Realistic	Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.	Mechanics, Cooks, Carpenters, Aircrafts Pilots, Farmers
Investigative	Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.	Medical doctors, Physicists, Computer Programmers
Artistic	Artistic occupations frequently involve working with forms, designs and patterns. They often require self-expression and the work can be done without following a clear set of rules.	Musicians, Writers, Architects
Social	Social occupations frequently involve working with, communicating with, and teaching people. These occupations often involve helping or providing service to others.	Teachers, Child-care Workers, Social Workers
Enterprising	Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.	Managers, Judges, Trade Brokers
Conventional	Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.	Secretaries, Office Clerks, Bookkeepers,

RIASEC

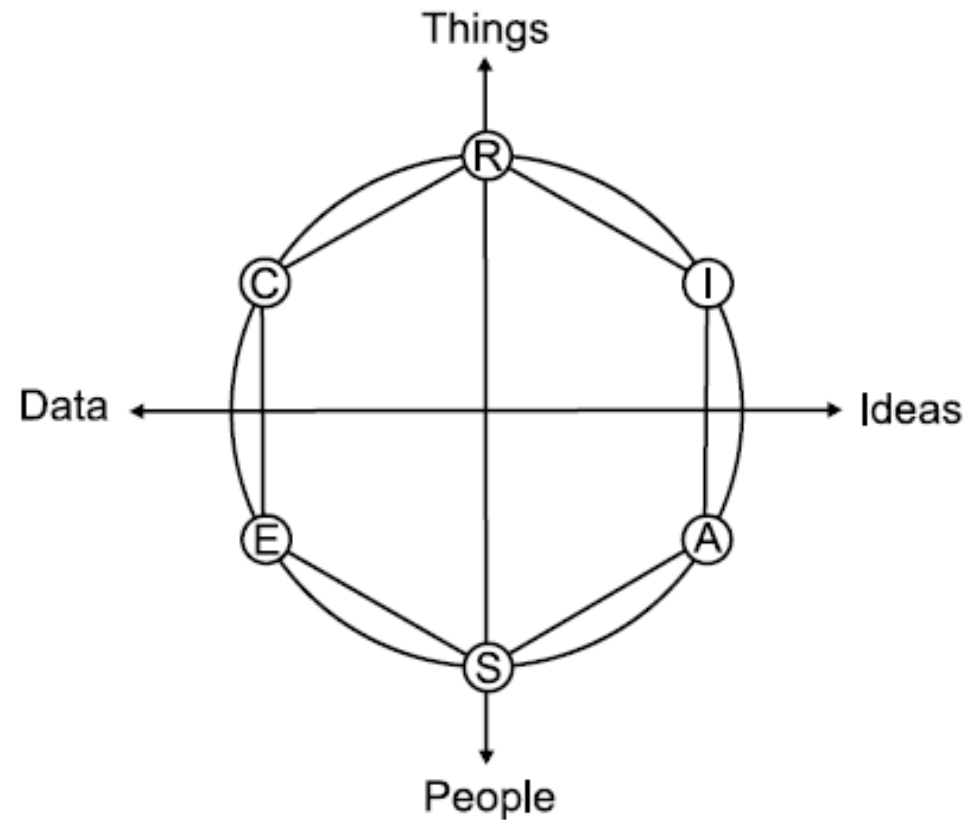
- Structure



- ✓ Global structure (Guttman's circumplex) is validated by numbers of study in many countries
- ✓ Debate on proximities between some groups (e.g. E & C)

RIASEC

- Structure (according to Prediger)

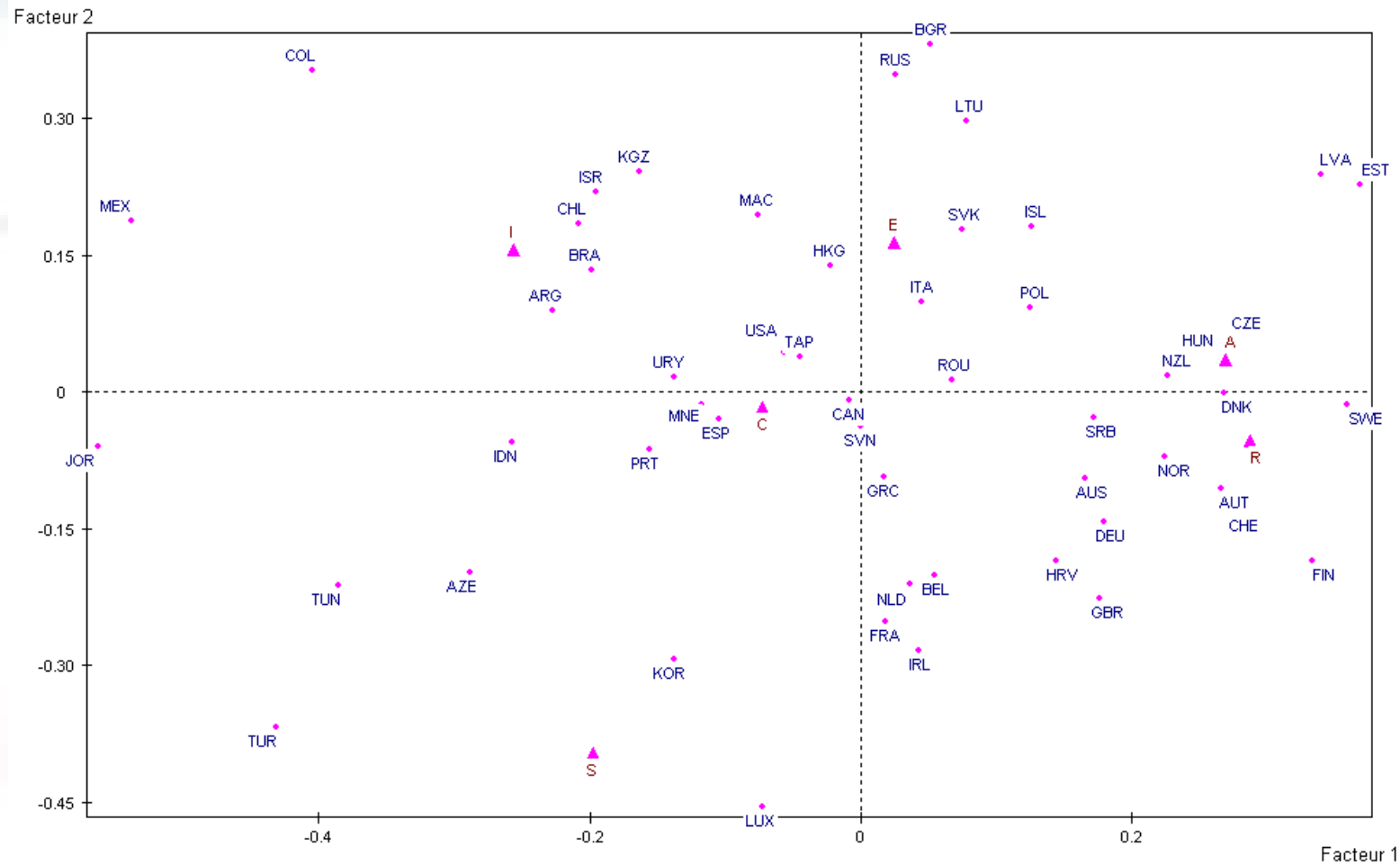


Objective & method

- A lot of literature on structure validation
- PISA data does not allow a pure validation study of the structure ...
- ... but give rich information on the relative weight of each category, in various contexts
- Method :
 - ✓ transformation from ISCO to Holland
 - ✓ *via* O*NET : correspondence between specific job classification and Holland categories
 - ✓ Work to come : a second level

Global analysis

- Correspondence analysis

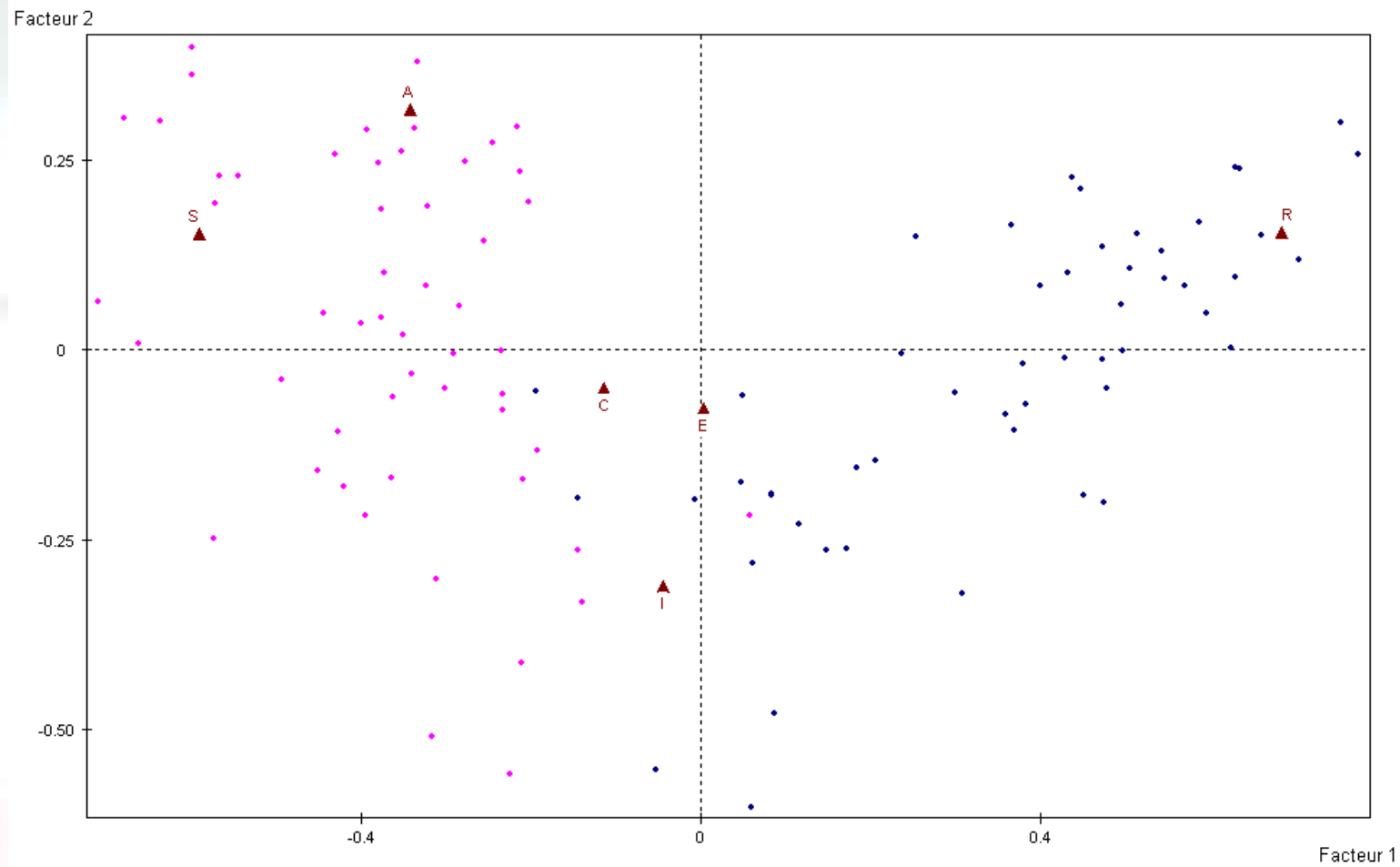


Cluster analysis

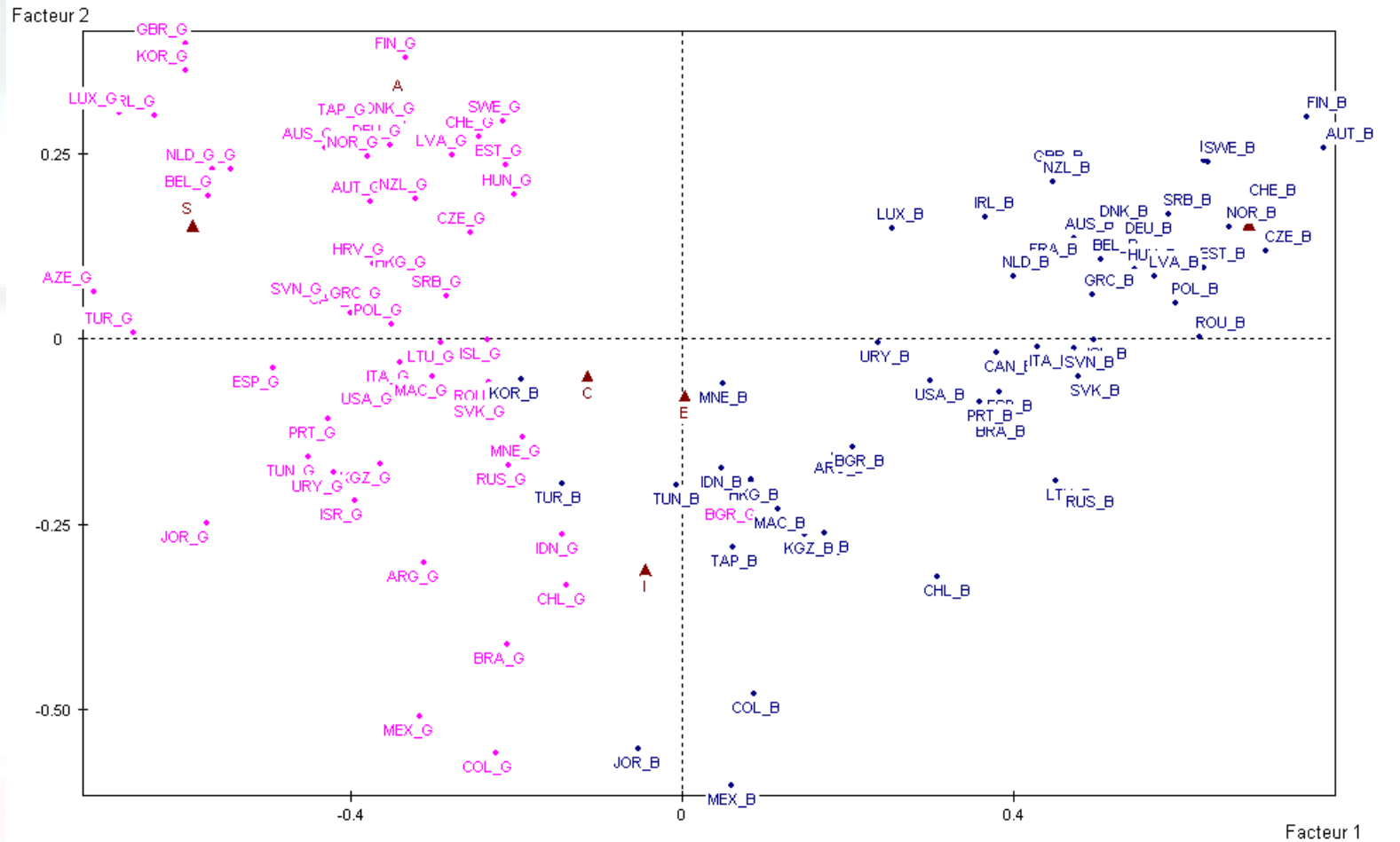
- Hierarchical classification

Clusters	Countries	+	-
1	ARG BRA CHL COL MEX	I	A
2	BGR ISR KGZ LTU RUS SVK	E	S
3	HKG IDN MAC MNE	C	R
4	AZE JOR TUN TUR	S	A, R
5	CAN ESP GRC ITA PRT SVN TAP URY USA	I	E
6	BEL FRA GBR IRL KOR LUX NLD	S	I
7	AUT CHE CZE DEU HRV ROU SRB	R	I
8	AUS DNK EST FIN HUN ISL LVA NOR NZL POL SWE	A, R	S, I

Gender*country

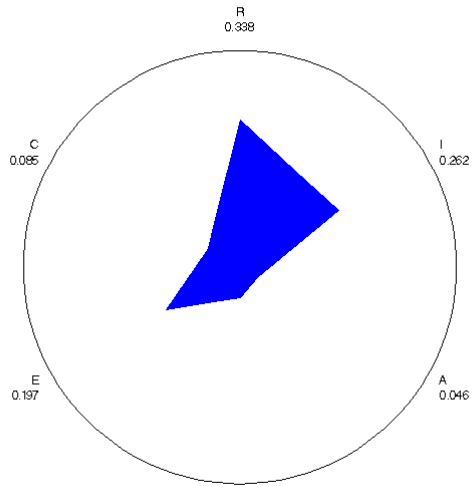


Gender*country

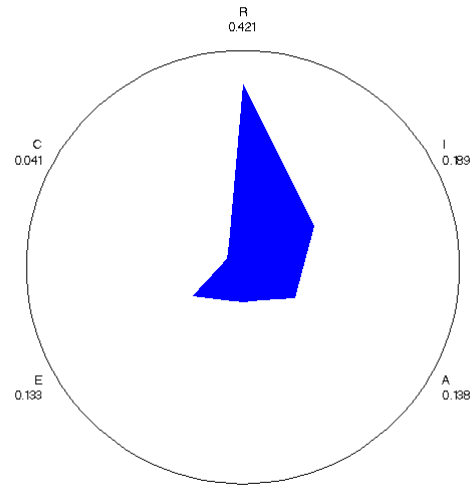


Examples - boys

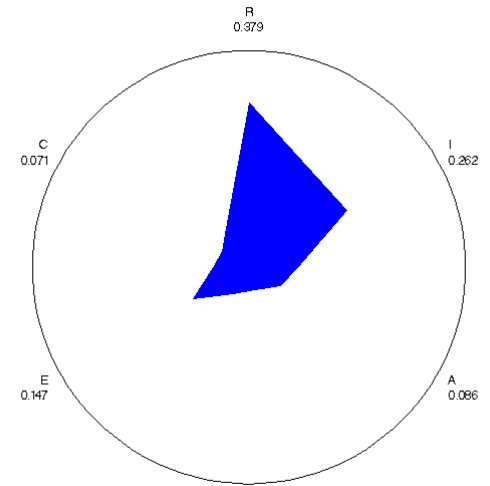
BRA boys
SUM of BRA by holland



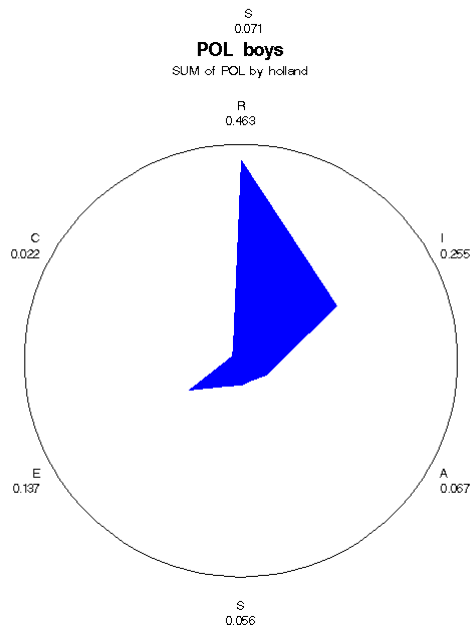
GBR boys
SUM of GBR by holland



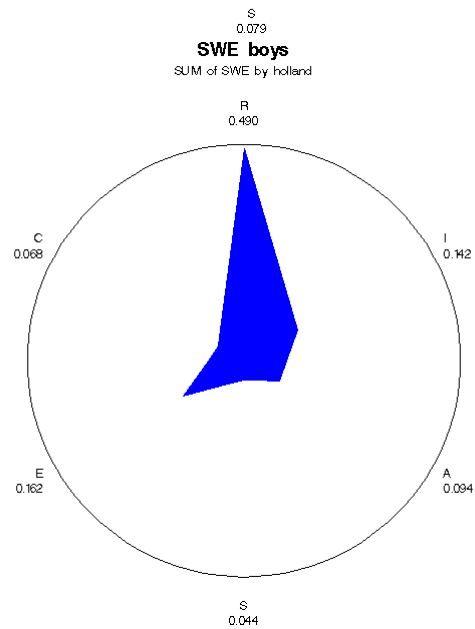
ITA boys
SUM of ITA by holland



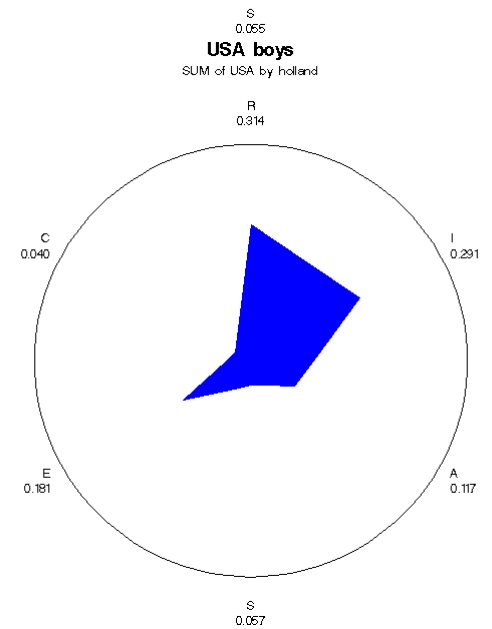
POL boys
SUM of POL by holland



SWE boys
SUM of SWE by holland

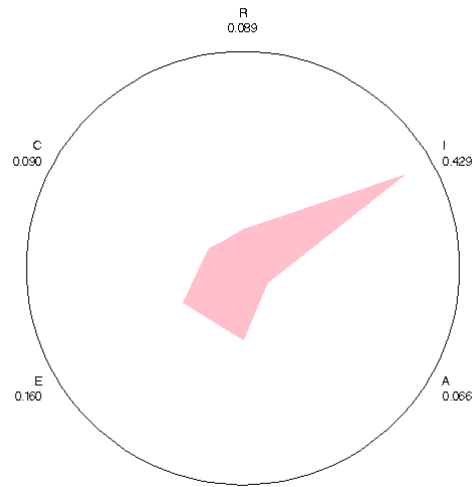


USA boys
SUM of USA by holland

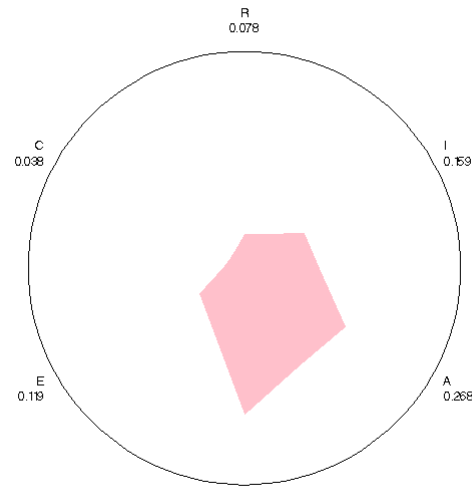


Examples -girls

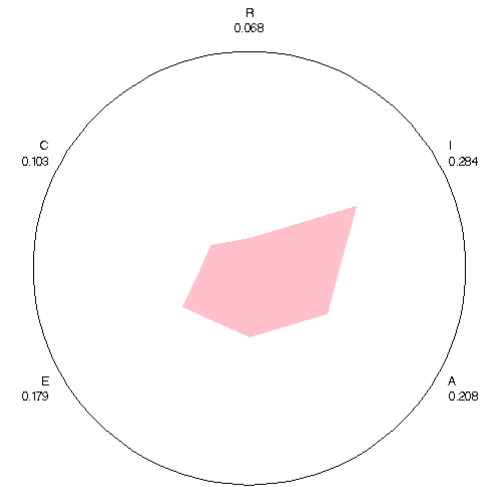
BRA girls
SUM of BRA by holland



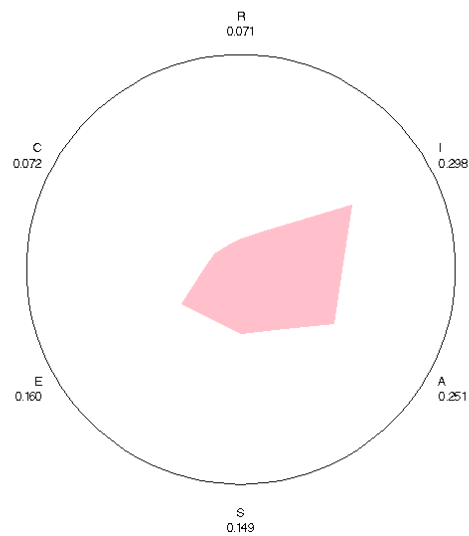
GBR girls
SUM of GBR by holland



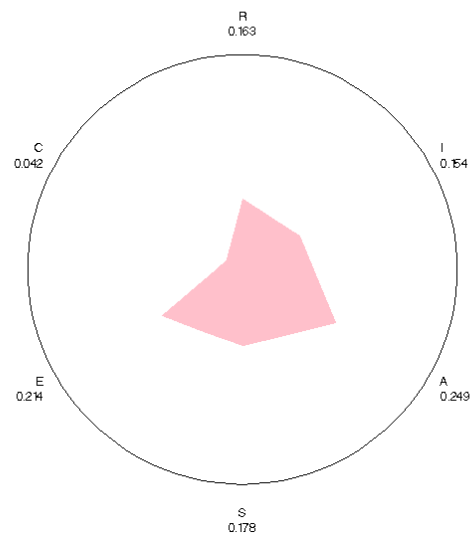
ITA girls
SUM of ITA by holland



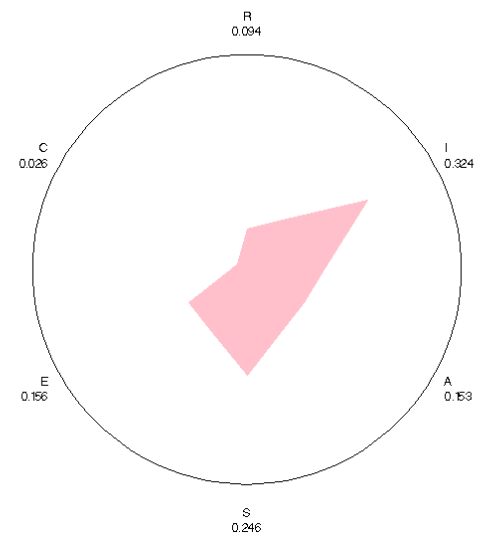
POL girls
SUM of POL by holland



SWE girls
SUM of SWE by holland



USA girls
SUM of USA by holland





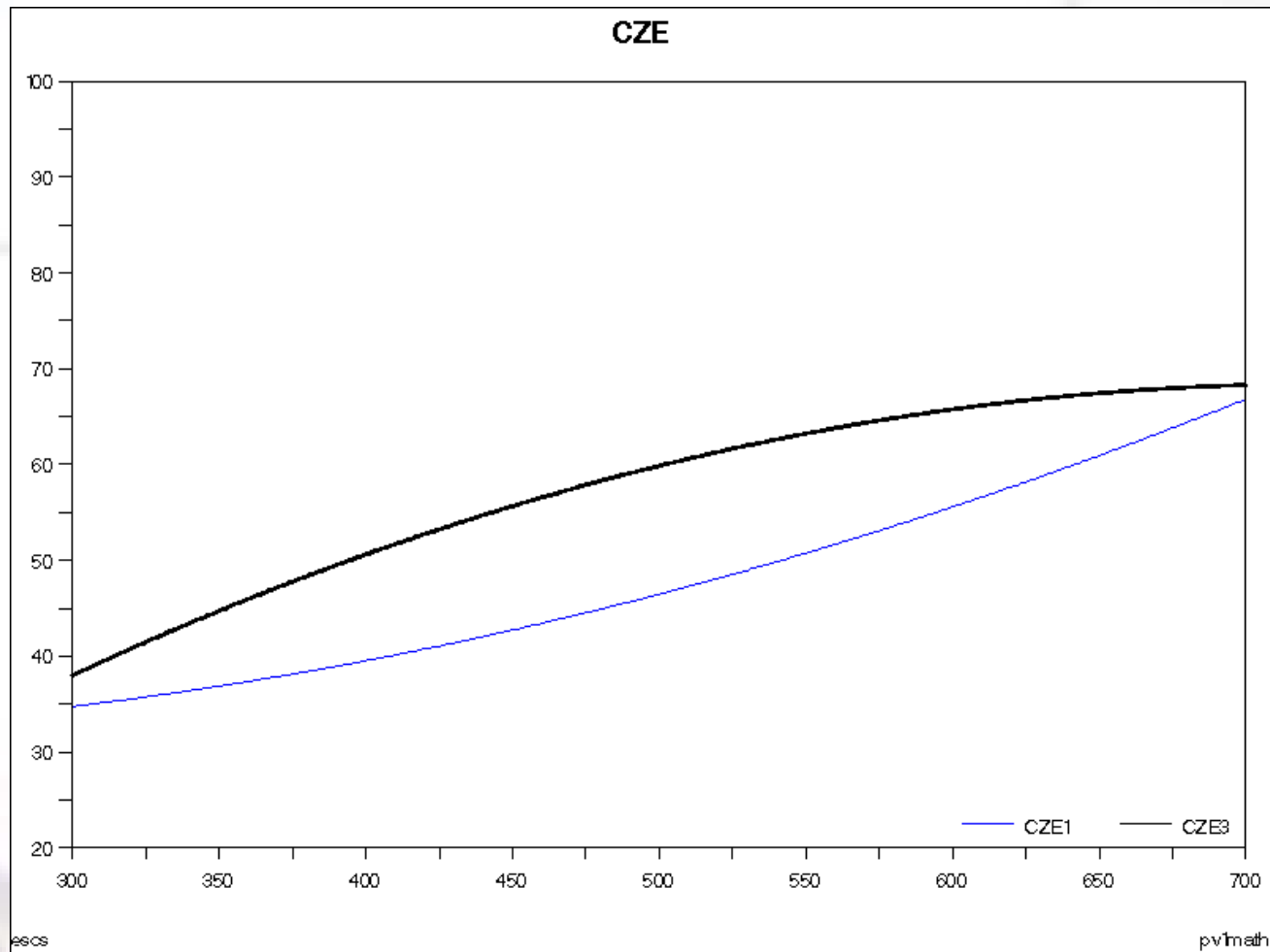
Ambition

Introduction

- Students' expectations : important variable to understand the social inequalities at school
- Expectations depend on social background, gender, performance, ...
- ...and have an impact on school career, when other variables are controlled
- Different interpretations : rational agent (anticipations, estimation of cost/investment) / social reproduction (auto-selection, cultural heritage)
- Simplification : students' choices are made to satisfy ambition
- Missing variables :
 - ✓ Parental expectations
 - ✓ Students' school future
 - ✓ "Initial point"

Social background

- Interaction score * ESCS



Multivariate

CNT	HISEI	HEDRES	WEALTH	GIRLS	IMMIG2	IMMIG3	MAT	READ	SCIE	M_MAT	M_HISEI
ARG	*	*	-	*	/	/	*	*	*	-	*
AUS	*	*		*	*	*	*	*	*	*	*
AUT	*	*		*	*	*	*	*	*	*	*
AZE	*	*		*	/	/	*	*	*	-	*
DEL	*	*		*	*	*	*	*	*	*	*
DGR				*	/	/		*	*		*
DRA				*	/	/	-	*	*		*
CAH	*	*		*	*	*	*	*	*	-	*
CHE	*	*	*	*	*	*	*	*	*	*	*
CHL	*	*		*	/	/	*	*	*	*	*
COL				*	/	/	-	*	*	*	*
CZE	*	*	*	*	/	/	*	*	*	*	*
DEU	*	*		*	*	*	*	*	*	*	*
DNK	*	*		*	*	*	*	*	*	-	*
ESP	*	*		*	*	*	*	*	*	-	*
EST	*	*	*	*	*	*	*	*	*	*	*
FIN	*	*		*	/	/	*	*	*	-	*
FRA	*	*		*	*	*	*	*	*	*	*
GDR	*	*		*	*	*	*	*	*	-	*
GRC	*	*		*	*	*	*	*	*	*	*
HKG		*		*	*	*	-	*	*	*	*
HRV	*	*		*	*	*	*	*	*	*	*
HUN		*		*	/	/	*	*	*	*	*
IDH			-	*	/	/	*	*	*	*	*
IRL	*	*	*	*	*	*	*	*	*	*	*
ISL	*	*		*	/	/	*	*	*	-	*
ISR	*	*	*	*	*	*	*	*	*	*	-
ITA	*	*	*	*	*	*	*	*	*	*	*
JOR	*	*		*	*	*	*	*	*	-	*
JPH	*	*		*	/	/	*	*	*	*	*
KGZ	*	*	*	*	/	/	*	*	*	-	*
KOR	*	*		*	/	/	*	*	*	*	*
LIE	*	*		*	/	/	*	*	*	*	*
LTU	*	*		*	/	/	*	*	*	-	*
LUX	*	*		*	*	*	*	*	*	*	*
LYA	*	*		*	*	*	*	*	*	*	*
MAC		*	-	*	/	/	*	*	*	*	*
HXX	*	*	-	*	/	/	-	*	*	-	*
MNE				*	/	/	*	*	*	*	*
MLD	*	*		*	*	*	*	*	*	*	*
MOR		*		*	*	*	*	*	*	-	*
HLL	*	*		*	/	/	*	*	*	-	*
POL	*	*		*	/	/	*	*	*	*	*
PRT	*	*	*	*	/	/	*	*	*	-	*
ROU	*	*		*	/	/	*	*	*	*	*
RUS	*	*		*	/	/	*	*	*	*	*
SRB	*	*	-	*	/	/	*	*	*	*	*
SVK	*	*	*	*	/	/	*	*	*	*	*
SVN	*	*		*	*	*	*	*	*	*	*
SVE	*	*	*	*	*	*	*	*	*	-	*
TAP	*	*		*	/	/	*	*	*	*	*
THA		*		*	/	/	*	*	*	*	*
TUH		*	-	*	/	/	*	*	*	*	-
TUR	*	*	-	*	/	/	*	*	*	*	*
URY				*	/	/	*	*	*	*	*



Comparison 2000-2006

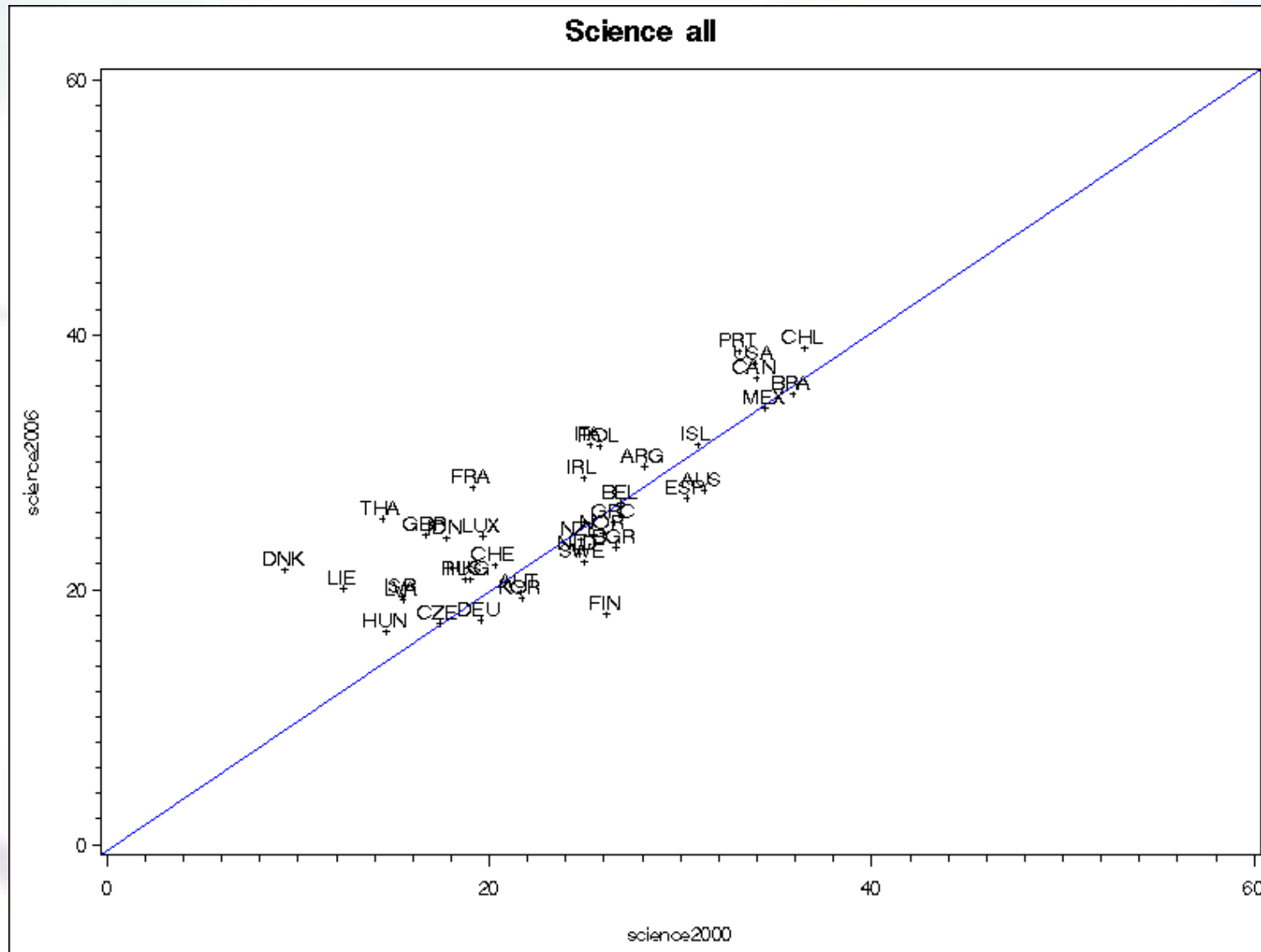
Introduction

- Workforce :
 - ✓ Lack of sufficient workforce (science,...)
 - ✓ Gaps between workers and jobs
- Illustration : science
 - ✓ Concern about a lack of interests in scientific courses (OECD Forum, 2006), a global phenomenon ?
 - ✓ Lack of precise statistics

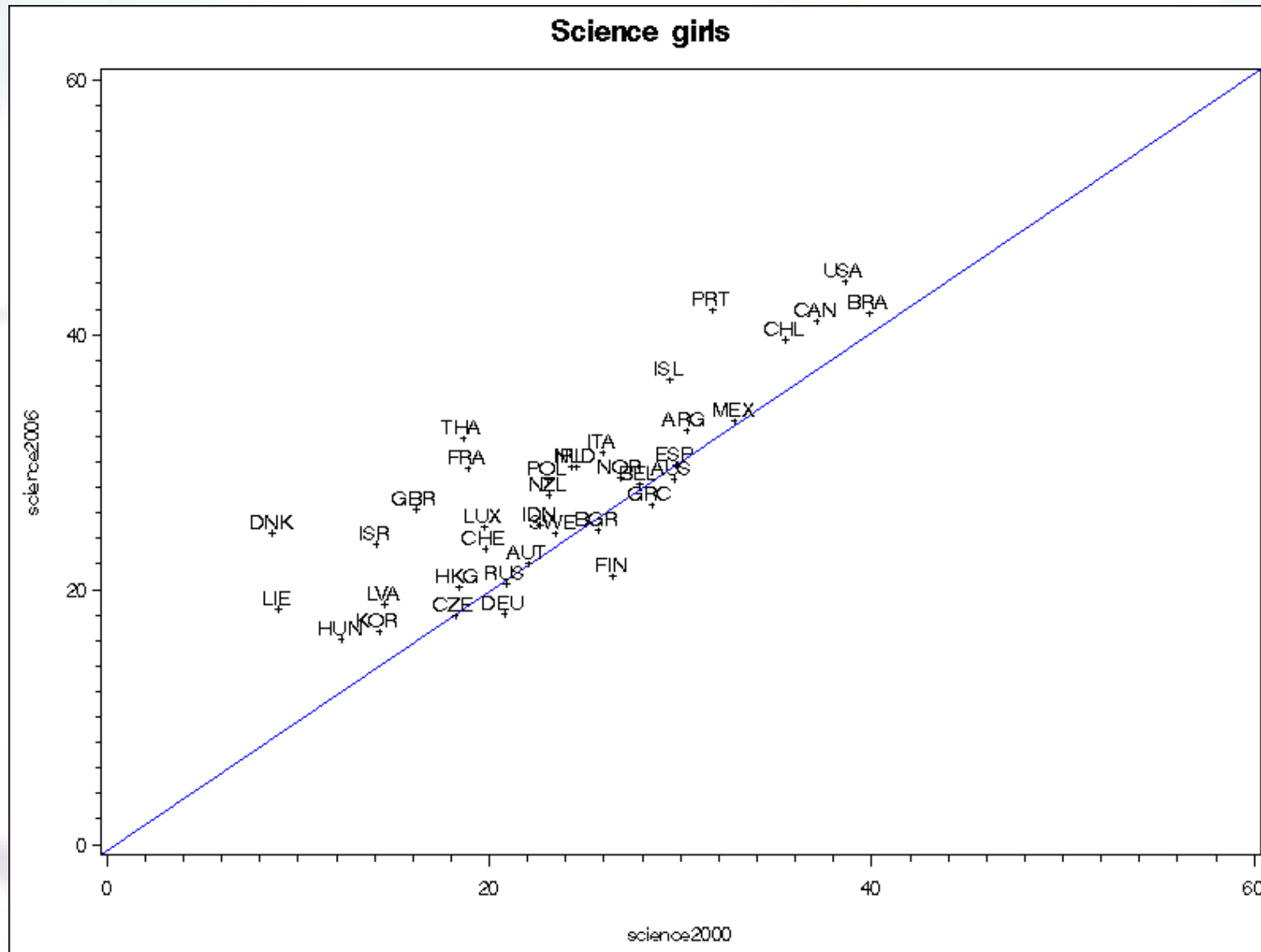
ISCO & Science

1236	Computing services department managers
1237	Research and development department managers
211	Physicists, chemists and related professionals
2122	Statisticians
213	Computing professionals
214	Architects, engineers, etc. professionals
221	Life science professionals
222	Health professionals except nursing
223	Nursing and midwifery professionals
2442	Sociologists, anthropologists etc. professionals
2445	Psychologists
2446	Social work professionals
311	Physical and engineering science associate professionals
313	Optical and engineering science associate professionals
3143	Aircraft pilots etc., associate professionals
3144	Air traffic controllers
3145	Air traffic safety technicians
315	Safety and quality inspectors
321	Life science etc, associate professionals
322	Modern health professionals except nursing
323	Nursing and midwifery associate professionals

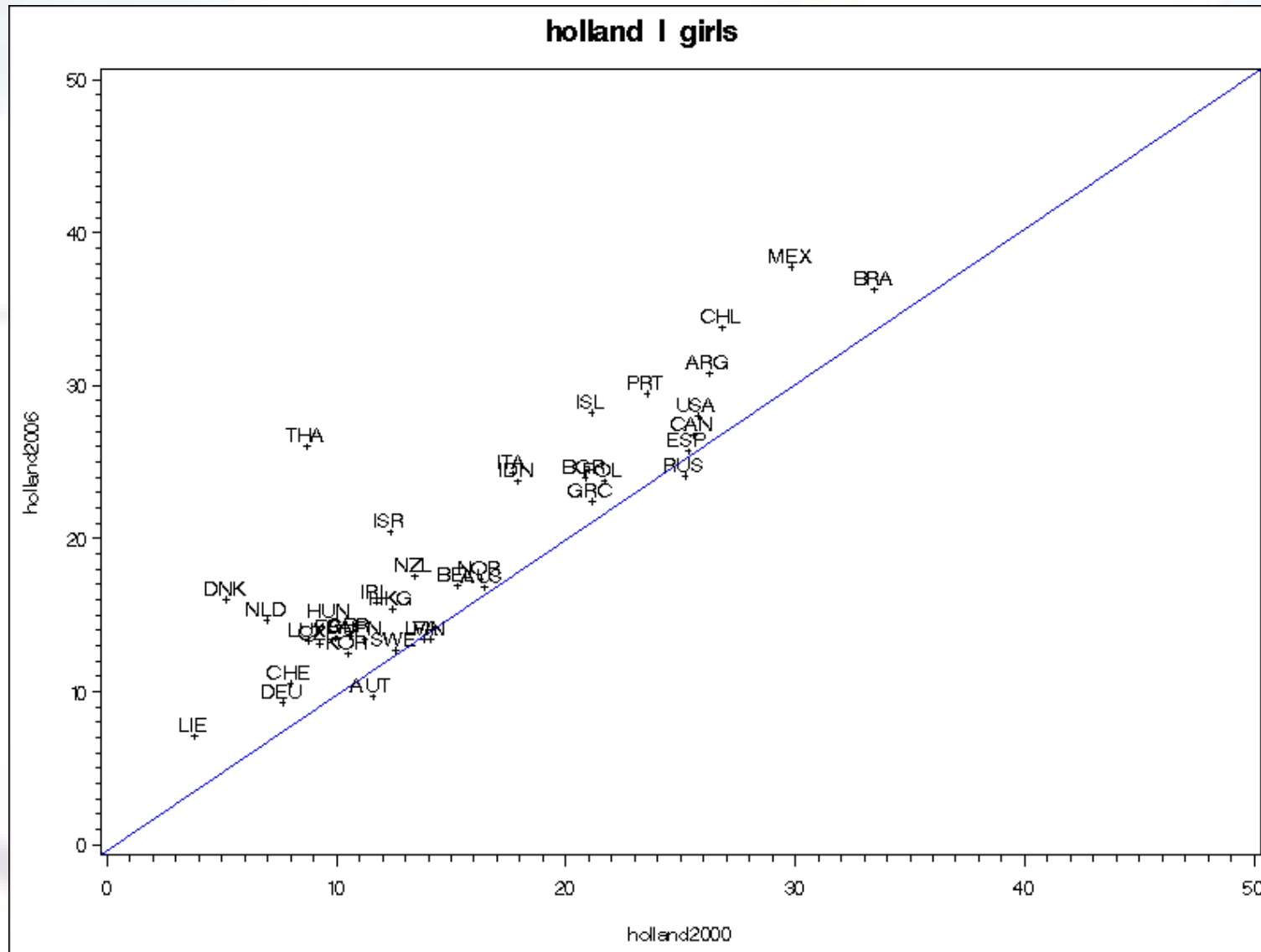
Science +



Science girls +



Investigative girls +





Annex

Indices

- SEI :
 - ✓ Socio-Economic Index, Ganzeboom et al. (1992)
 - ✓ Scores to occupations that maximize the role of occupations on income when education level is fixed
 - ✓ From 16 (farm-hands, forestry labourers) to 90 (judges)
- ESCS :
 - ✓ Economic Social and Cultural Status
 - ✓ $ESCS = F(HISEI, PARED, HOMEPOS)$
 - ✓ HISEI : Highest SEI
 - PARED : Parental Education
 - HOMEPOS = $F(WEALTH, CULTPOS, HEDRES)$
 - WEALTH : index of family wealth
 - CULTPOS : index of cultural possession
 - HEDRES : index of educational resources

SEI examples

2422	Judges	90
2221	Medical doctors	88
2132	Computer programmers	71
2320	SECONDARY EDUCATION TEACHING PROFESSIONALS	69
2145	Mechanical engineers	67
1225	Production dep. managers restaurants & hotels	59
4115	Secretaries	53
1314	[Small enterprise] General managers wholesale & retail trade	49
3113	Electrical engineering technicians	46
5220	SHOP SALESPERSONS & DEMONSTRATORS	43
3231	Nursing associate professionals [incl. Trainee Nurses]	38
8310	LOCOMOTIVE-ENGINE DRIVERS ETC WORKERS	36
5123	Waiters, waitresses & bartenders	34
7136	Plumbers & pipe fitters [incl. Well Digger]	33
7412	Bakers, pastry-cooks & confectionery makers	31
8120	METAL-PROCESSING-PLANT OPERATORS	30
8322	Car, taxi & van drivers [incl. Taxi Owner nfs]	30
5141	Hairdressers, barbers, beauticians etc workers	29
5131	Child-care workers [incl. Nursemaid, Governess]	25
9161	Garbage collectors [incl. Dustwoman]	23
9313	Building construction labourers [incl. Handyman, Hod Carrier]	21
9211	Farm-hands & labourers [incl. Cowherd, Farm Helper, Fruit Picker]	16

SEI by ISCO, RIASEC, Science

	N	Mean	Std Dev	Minimum	Maximum
TOTAL	533	43.2	16.9	16	90
ISCO1					
1	45	61.6	9.2	43	87
2	75	70.1	8.8	43	90
3	94	51.7	6.4	38	69
4	32	45.7	6.1	32	53
5	33	35.5	8.7	19	54
6	28	23.8	3.2	16	28
7	96	32.8	4.9	19	45
8	92	30.7	3.8	22	41
9	38	22.4	4.6	16	30
HOLLAND					
R	291	32.2	9.3	16	69
I	38	73.3	6.7	51	88
A	16	56.9	11.1	29	69
S	51	46.8	15.2	19	77
E	79	57.9	13.3	28	90
C	58	51.2	8.5	32	69
SCIENCE					
0	459	40.3	15.6	16	90
1	74	61.3	12.9	38	88