Language Acquisition and Bilingualism:
Consequences for a Multilingual Society
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Immigrant Bilinguals – effects of age of immigration on L2 Swedish and L1 Spanish

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Immigration to Sweden

- 1940s, 1950s: Waves of refugees, incipient labour immigration from neighbouring countries
- 1960s: labour immigration from southern and central Europe
- 1970-: refugees, family connection cases

Today

≈12 % of the population of 9 million

Most common countries of origin:

Finland, former Yugoslavia, Iran, Norway, Iraq

Most commonly spoken lgs of immigrant pupils: Arabic, Finnish, Spanish, Albanian, Persian

Bilingualism at school

- Right to mother tongue instruction since 1977; ≈ 50 % participate at their own choice
- Swedish as a second language since 1966
- Implementation problems are salient.

Age of onset and ultimate attainment in second language acquisition

(The Bank of Sweden Tercentenary Foundation)

Kenneth Hyltenstam (PI, project leader)

Niclas Abrahamsson (PI)

Katrin Stölten (SI, PhD student)

Johan Roos, Gunilla Thunberg (assistants)

First Language Attrition in Advanced Second Language Learners

(The Swedish Research Council)

Niclas Abrahamsson (PI, project leader)

Kenneth Hyltenstam (PI)

Emanuel Bylund, Katrin Stölten (SI, PhD students)

Alejandra Donoso (assistant)

Questions for this talk

1. What is the rate of ”complete” SL acquisition among late learners? (Selinker, 1972: 5 %; Birdsong, 1999, 2005: 15%; Piller, 2005: 45%; Bley-Vroman, 1989: 0 %)
2. What is the rate among prepuberty learners? (Hyltenstam, 1992; Tsukada, Birdsong, Bialystok, Mack, Sung & Flege, 2005)
3. What is the rate perceived nativelikeness?
4. What is the rate of scrutinized nativelikeness?
5. To what extent are these rates related to certain age of aquisition spans? Correlations with other background factors?
6. Do patterns of L1 use correlate with degree of perceived or scrutinized nativelikeness in L2? (Flege et al. 1995; Pallier et al. 2003; Ventureyra et al. 2004)

Methodological outline

1. Identification of candidates for nativelikeness
2. Screening for nativelikeness
3. Many complex tests and detailed analyses of nativelikeness

Identification of nativelike candidates

- Advertisement 1 in Metro 16 September 2002
  125×182 mm
  → 135 candidates

625 000–720 000 readers per day

- Advertisement 2 in Metro 16 April 2003
  125×182 mm
  → 50 candidates

- Advertisement 3 in Aftonbladet
  15 March 2004, 250×100 mm
  → 10 (!) candidates

325 000 readers per day

Identification of nativelike candidates

Six selection criteria:

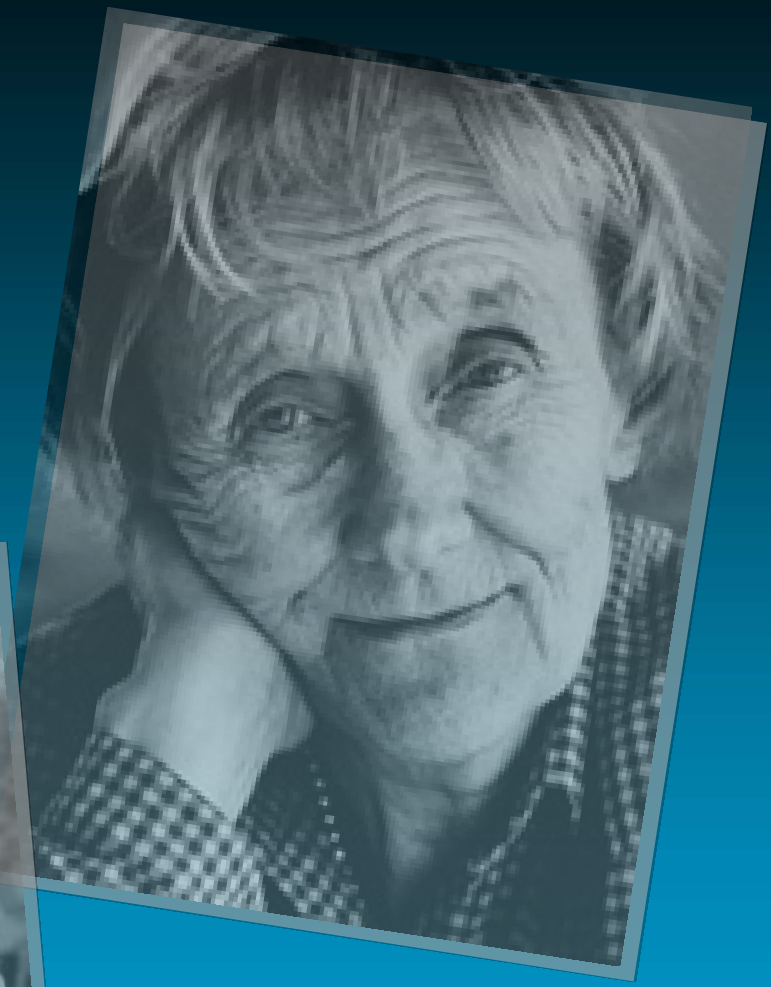
1. L1: Spanish
2. speak Swedish like a native speaker
3. ≥ 19 years old
4. length of residence in Sweden: ≥ 10 years
5. 12 years of education (minimum)
6. speak the Stockholm variety of Swedish

Telephone interview (recorded)

- Age of onset (AO) of acquisition of Swedish
- Present age (AGE)
- Length of residence (LOR) in Sweden
- Pattern and frequency of use of Spanish and Swedish
- Knowledge of other languages
- Longer periods away from Sweden / the Stockholm area
- Any known hearing impairment or dyslexia
- Handedness

Speech elicitation

- Describe Astrid Lindgren and her books and characters for about one minute



Background variables

Background information (independent variables) on the 195 candidates; comparison between those with AO before and after puberty (*df* = 193).

	AO ≤ 11 years (*n* = 107)		AO ≥ 12 years (*n* = 88)		t-test	
Independent variable	*M*	*SD*	*M*	*SD*	*t*	*p*
Chronological age	28,6	7,2	41,5	9,1	–11.1	< .0001
Years in Sweden	23,1	7,5	21,2	7,3	1.82	> .071ns
Years of L2 exposure	22,4	7,4	20,9	7,3	1.41	> .1, ns
Daily L1 use (%)	27,4	17,5	30,9	18,1	–1.34	> .1, ns
Sex (f/m)	69/31		61/39		–1.14	> .1, ns

Screening experiments

- Three computerized screening experiments
- The first 20–30 sec. of the Astrid Lindgren descriptions
- … and descriptions over the telephone from 20 native speakers of Swedish (10 from Stockholm, 10 with subtle non-stockholmian features in their pronunciation)
- 10 native Swedish judges per experiment (not linguists, phoneticians, etc.; no knowledge of Spanish)
- C. 45-90 minutes, SEK 100–150:- (≈ $13 – 20)

Screening experiments

I believe that this person:

A. has Swedish as a mother tongue and comes from Stockholm

B. has Swedish as a mother tongue but does not come from Stockholm

C. has another mother tongue than Swedish

Screening experiments

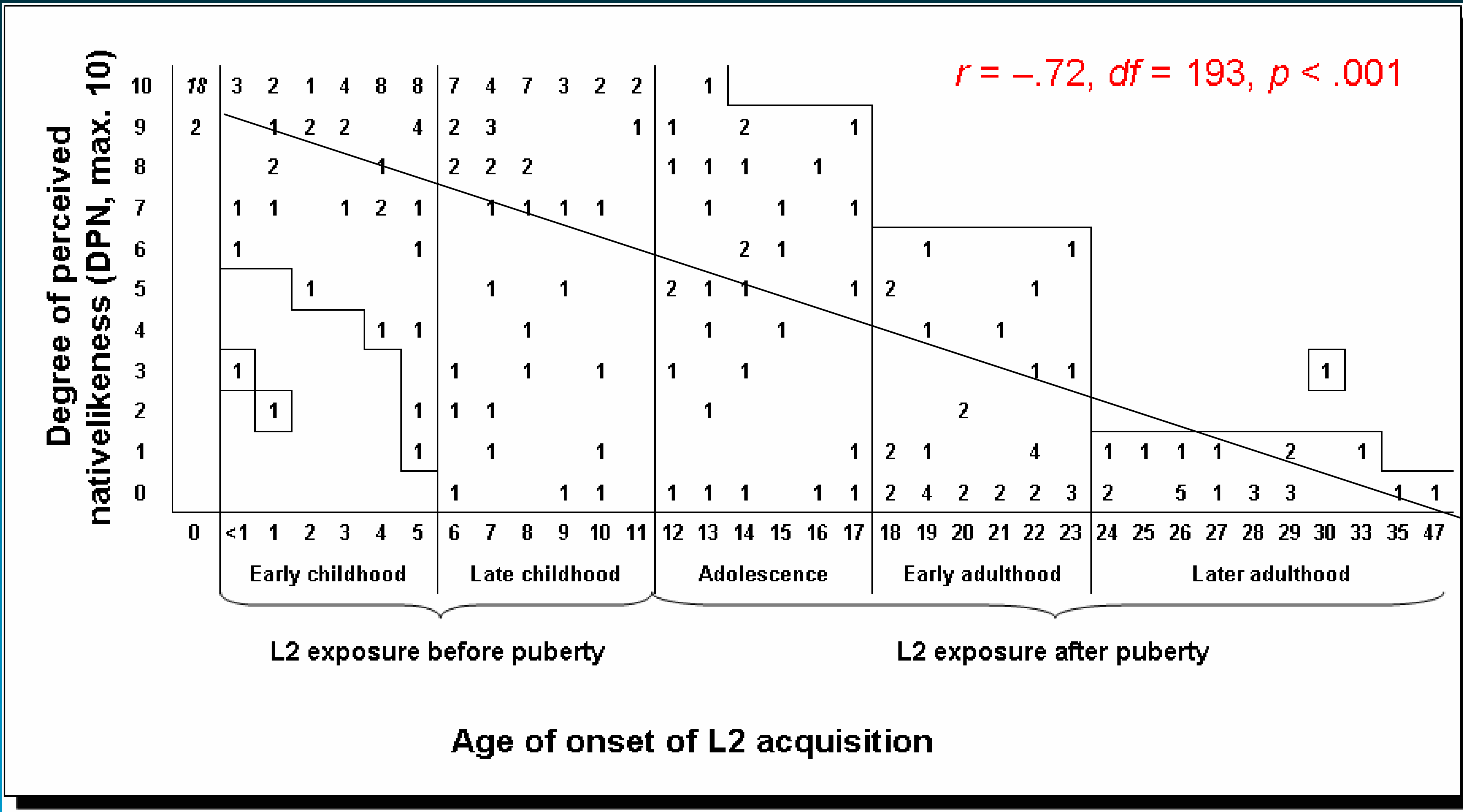
- Scoring:
  - Alternatives A and B = speaks Swedish as a native speaker
  - Alternative C = does not speak Swedish as a native speaker
- Degree of perceived nativelikeness (DPN) = the number of judges who chose alternative A or B

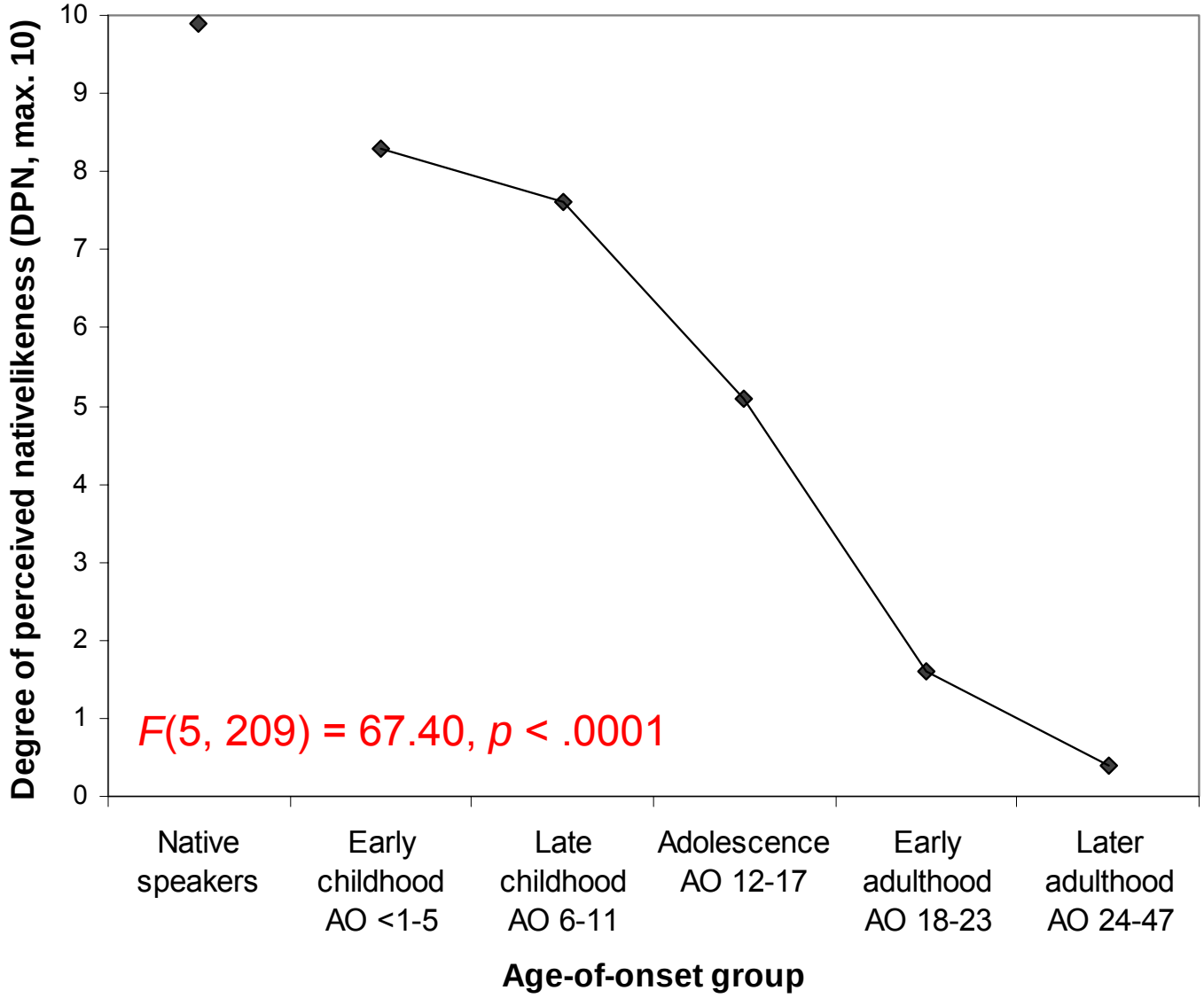
Listening experiments

	L2	+	L1	
Experiment 1:	135	+	20	= 155
Experiment 2:	50	+	8	= 58
Experiment 3:	40+10	+	8	= 58

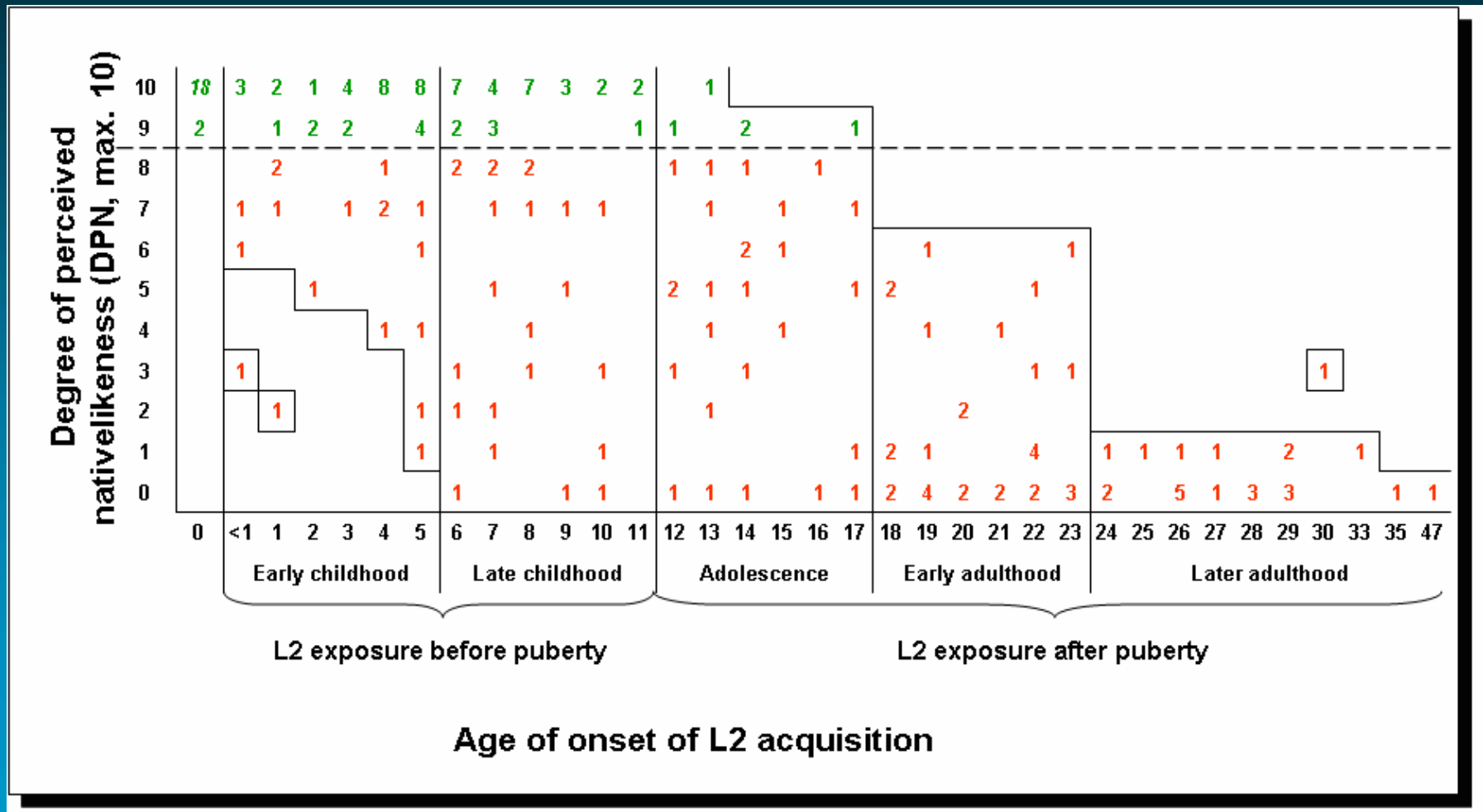
Interrater reliability: r = .97, df = 38, p < .001

Screening results




Degree of perceived nativelikeness (DPN, max. 10)
10
9
8
7
6
5
4
3
2
1
0
F(5, 209) = 67.40, p < .0001
Native speakers
Early childhood AO <1-5
Late childhood AO 6-11
Adolescence AO 12-17
Early adulthood AO 18-23
Later adulthood AO 24-47
Age-of-onset group

Individual screening results

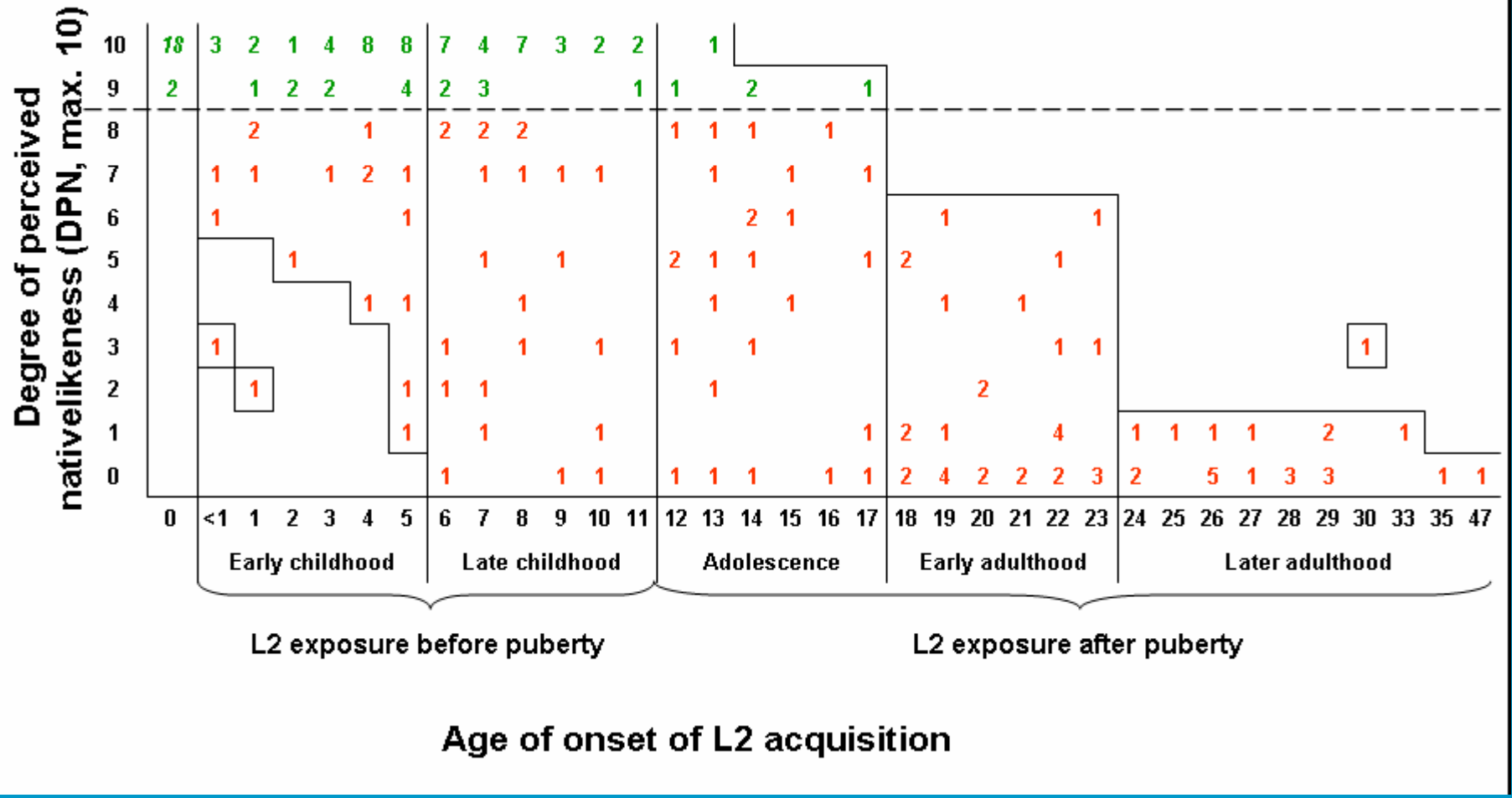


DPNs among 195 candidates

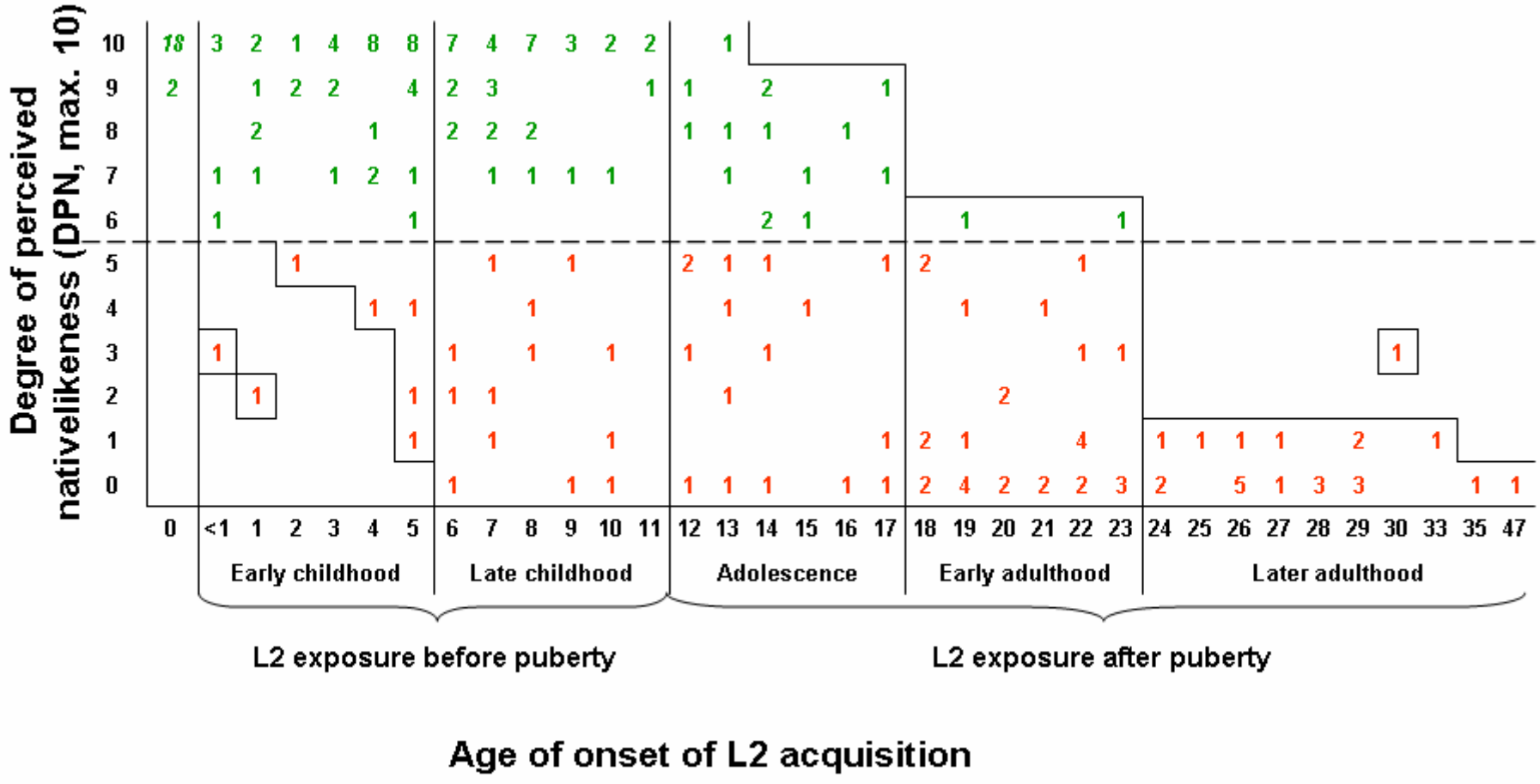
Number and percentage of the subjects with the two highest (9 –10) and the two lowest (0–1) DPN, and of those subjects with DPN in between (2–8).

DPN	Native speakers ($N = 20$)	AO ≤ 11 years ($n = 107$)	AO ≥ 12 years ($n = 88$)	All L2 subjects ($N = 195$)
9–10	20 (100%)	66 (62%)	5 (6%)	71 (36%)
2–8	–	35 (32%)	32 (36%)	67 (35%)
0–1	–	6 (6%)	51 (58%)	57 (29%)

Individual screening results



Individual screening results



Main subjects: 41
Additional subjects: 24

Age of onset	Nativelike subjects (DPN 6–10) Sp 0–10%	Sp 20–30%	Sp 40–50%	Adoptees	Near-native subjects (DPN 3–5)	Non-nativelike subjects AO ≤ 12 (DPN 0–2)
1	🧍	🧍	🧍	🧍		🧍
2	🧍	🧍 🧍		🧍		
3	🧍	🧍	🧍			
4	🧍	🧍	🧍	🧍		
5	🧍	🧍	🧍		🧍	🧍
6	🧍	🧍	🧍		🧍	🧍
7	🧍	🧍	🧍			🧍
8	🧍	🧍	🧍		🧍	
9	🧍	🧍 🧍		🧍	🧍	
10	🧍	🧍			🧍	🧍
11	🧍		🧍			
12					🧍	🧍
13	🧍		🧍		🧍	-
14	🧍	🧍	🧍		🧍	-
15		🧍	🧍		🧍	-
16			🧍			-
17		🧍			🧍	-
18					🧍	-
19			🧍		🧍	-
20+			(🧍)		🧍	-
M % Sp	9%	26%	42%	---	23%	32%
N	13	15	13 (14)	4	13	6

Background variables, main subjects

Background information (independent variables) on the 41 main subjects; comparisons between those with AO before and after puberty ($df = 39$).

	AO ≤ 11 years ($n = 31$)		AO ≥ 13 years ($n = 10$)		t-test	
Independent variable	*M*	*SD*	*M*	*SD*	*t*	*p*
Chronological age	30.9	6.62	37.2	6.91	–2.60	= .013
LOR in Sweden	25.5	7.08	22.3	5.95	1.31	> .1
Years of L2 exposure	25.2	6.91	22.2	5.90	1.22	> .1
Daily L1 use (%)	23,5	13,4	31,5	12,9	–1.65	> .1
Sex (f/m)	7/31		0/10			

Control subjects

- 15 native speakers of Stockholm Swedish …
- … who were not linguists, phoneticians, students of Swedish or modern languages, etc.
- Matched for age, sex, and education

Tests and instruments

- **Background interview + self assessments (L1 and L2)**
- **Hearing test (w. tone audiometer)**
- **Language learning aptitude test (5 subtests)**
- **Voice onset time (VOT): production of /p t k/ and /b d g/**
- **Voice onset time (VOT): categorical perception of /p-b/, /t-d/, and /k-g/**
- **Word perception in babble noise**
- **Sentence perception in white noise**
- **Grammaticality judgment test (GJT), presented in writing**
- **Grammaticality judgment test (GJT), presented auditorily (w. RTs)**
- **Proverbs**
- **Idiomatic expressions**
- **Cloze test**
- **Production (four modalities: word list, sentences, text, picture story)**
- **First 15 minutes of *Modern Times* (online + retelling)**

Testing procedure

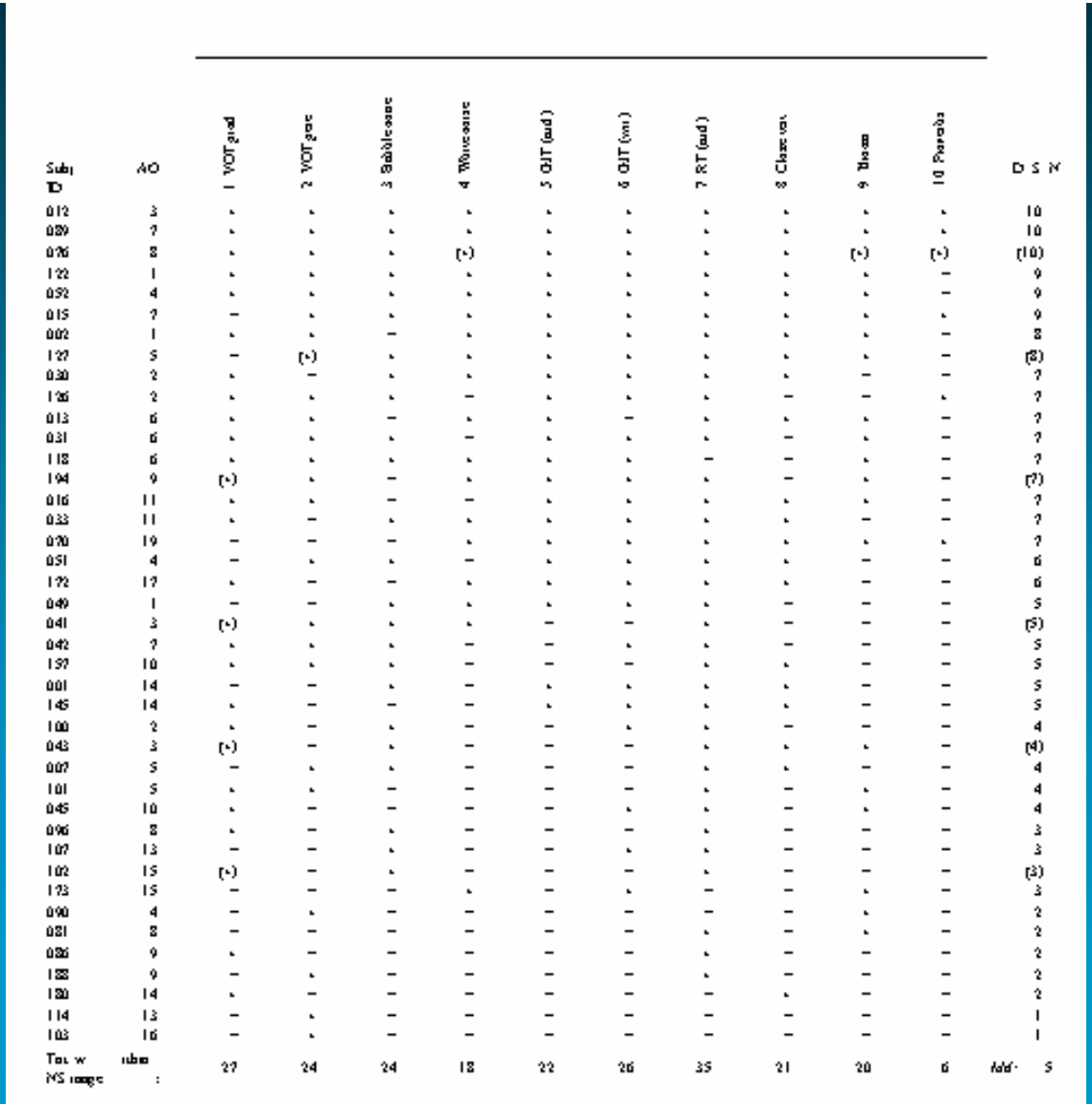
- Subjects were tested individually in a sound treated room
- Experimenter: male native speaker of Swedish
- Ca. 4 hours, including two 15-minute breaks with sandwich, fruit and refreshments
- Compensation: SEK 500:- (ca. €50,-)

Native speaker ranges

Instruments		*Max.*	NS *Mean*	NS *High*	NS *Low*
1. VOT production	/p/	—	16.9	22.7	11.7
(% of word dur.)	/t/	—	15.7	21.8	10.7
	/k/	—	18.3	25.5	14.6
2. VOT perception	/p-b/	—	7.2	27.8	–13.0
(ms.)	/t-d/	—	15.3	27.5	5.4
	/k-g/	—	24.6	33.3	17.9
3. Babble noise SNR, dB)		—	–7.46	–11.53	–5.06
4. White noise (score		21	16	18	12
5. Auditory GJT (score		80	69	78	57
6. Written GJT (score)		80	70	78	57
7. RT, aud. GJT (ms.)		—	7,729	7,160	8,888*
8. Cloze test (score)		42	36	41	30
9. Idioms (score)		50	43	48	33
10. Proverbs (score)		50	39	46	33

— = not applicable
* = the *lowest* NS result is represented by the *longest* reaction time.

Results within native speaker ranges on 10 measures



Korrelations L1 use patterns and perceived nativlikeness among 195 subjects (Pearson's *r*)

All subjects	*-.25***
AO ≤ 11	-.34**
AO ≥ 12	-.14

Adoptees

4 subjects, 3 measures

		Cloze	Idioms	Proverbs
	Max	42	50	50
	NS	30-41	33-48	33-46
AO				
1		36	44	42
2		34	42	40
4		27	29	32
9		13	21	21

Tests and instruments

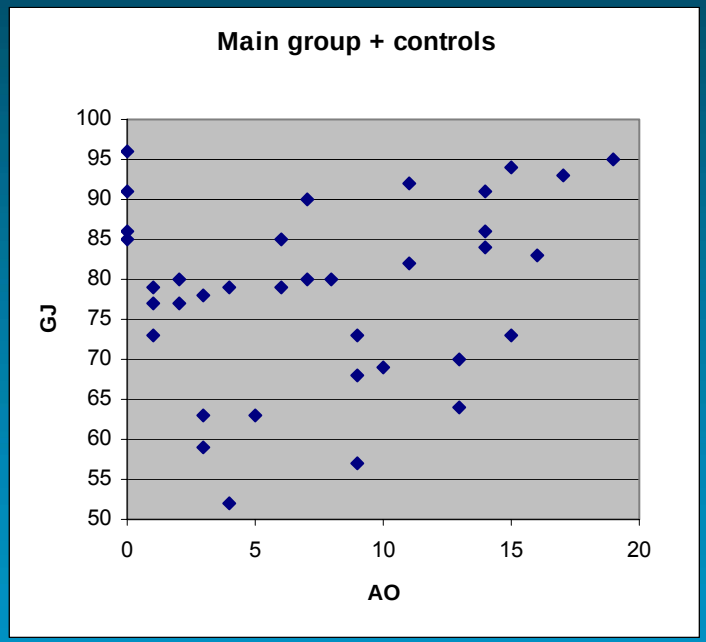
The Age of Onset Project (L2 Swedish)

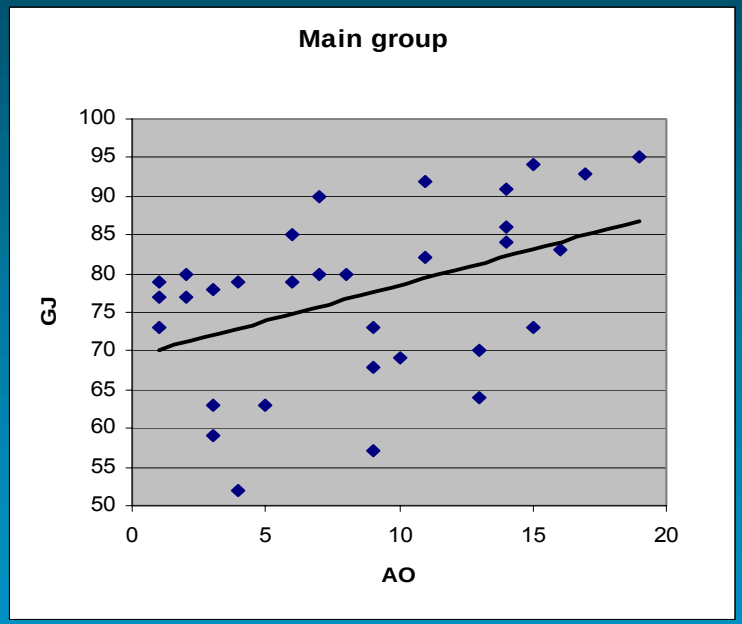
- Telephone interview + self assessments on L1 och L2
- Hearing test
- Language Aptitude Test (5 parts)
- Repetion in ”babble noise”
- Grammaticality Judgment (written)
- Grammaticality Judgment (auditory)
- Repetion in white noise
- Cloze test
- Production (four mod.)
- Proverbs
- Idiomatic expressions
- VOT: production of /p t k b d g/
- VOT: categorical perception
- Modern Times (online + retell.)
- –
- –
- –

The Attrition Project (L1 Spanish)

- Detailed questionnaire on L1 use
- –
- –
- –
- –
- GJ (auditory)
- Repetition in white noise
- Cloze test
- Production (four mod.)
- Proverbs
- Idiomatic expressions
- VOT: production of /p t k b d g/
- VOT: categorical perception
- Modern Times (online + retell.)
- Quest, retelling
- Verbalisation of single events
- 2 tense-aspect judgment tests

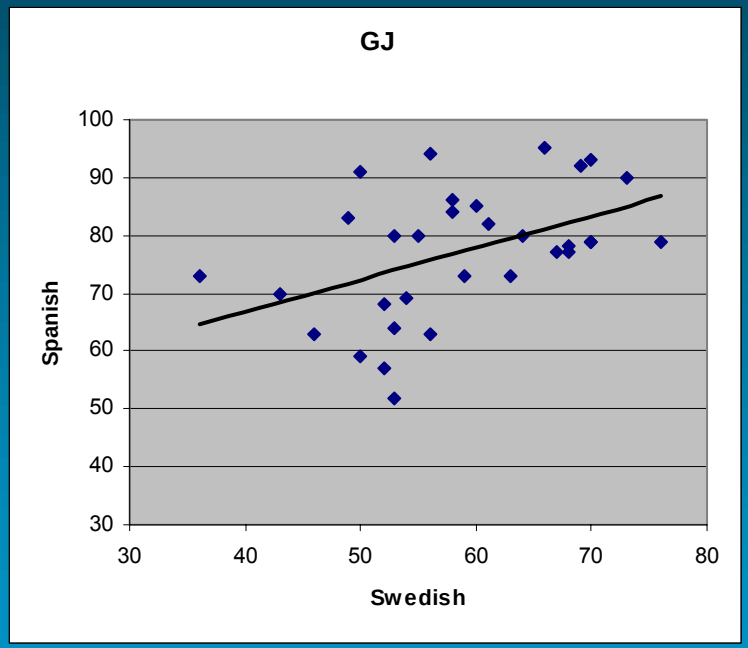
Korrelation between GJ Spanish and age at break with L1 majority commnity





r = 0,440778
p = *<.01*

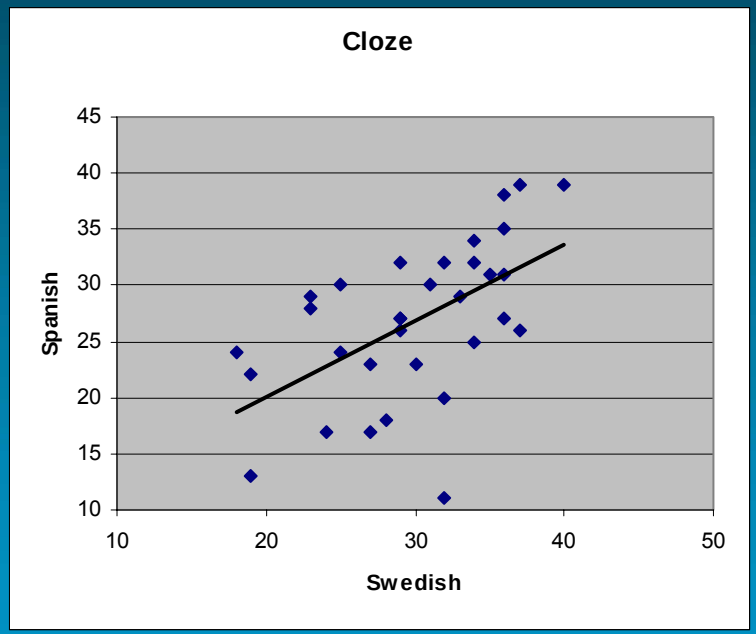
Correlation GJ Spanish - Swedish



Korr.

r = 0,463064,
p <.01

Correlation Cloze Spanish - Swedish



r = 0,565232
p <.001

Summary

1. A majority of the 107 pre-puberty learners were perceived as nativelike; 6 % by only 1 or 0 judges.
2. Most of the the 88 late learners were not perceived as nativelike, but 6 % of them passed for native speakers by 9 or 10 judges. However, a) the present subjects were heavily selected, b) only subjects with AO 12-17 (no subject among the 57 candidates with an AO beyond 17), and c) the sample the judges had to assess was 20-30 seconds long.
3. Only two, possibly three, of 41 learners had a scrutinized nativelikeness on all ten measures of proficiency. One post-puberty learner was within the range of native controls on 7 and another one on 6 measures.
4. AO is the strongest predictor of both perceived and scrutinized nativelikeness.
5. Patterns of L1 use correlates only weakly with degree of perceived or scrutinized nativelikeness. Indications that loss of L1 does not promote nativelikeness, and that L1 proficiency level is not inversely related to L2 proficiency level.

Consequences for a multilingual society

- Teaching and other support for second language acquisition should aim at an effective and functional SL proficiency.
- Nativelike SL proficience a questionable and in many cases unrealistic goal.
- Support for L1 development need not be sacrificed on the alter of nativelikeness.