More Individual Differences in Language Attainment

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Conventional wisdom:

All learners attain (more or less) the same grammar

- “……children in the same linguistic community all learn the same grammar.” (Crain & Lillo-Martin 1999:9)

- “…children are exposed to different samples of utterances but converge on the same grammar.”(Seidenberg 1997:1600)

- “Language learning cannot be by trial and error, otherwise children would not all converge on the same grammar.”(Hermon 2002)
Studies (adult participants)

Education related differences

- Polish genitive masculine inflection (Dąbrowska 2008)
- Polish dative inflections (Dąbrowska 2008)
- Complex English syntactic structure - complex NP, tough movement, parasitic gaps (Dąbrowska 1997, Chipere 2001)
- English passive (Dąbrowska & Street 2006)
- Universal quantifiers (Street & Dąbrowska 2010)
Studies (child participants)

- Universal quantifiers (Crain et al. 1996)
  Children aged: 3;5 - 5;10
  - Exp 2 comprehension - 88%
  - Exp 3 production - 98%

- Passives (Pinker et al. 1987)
  Children aged: 3;10
  - Exp 1 comprehension - at ceiling with nonce words in passive
  - production of passive with nonce verbs only encountered in active
English passives & universal quantifiers (Street & Dąbrowska 2010)

Main Aims

• Provide further evidence of individual differences in native language attainment

• Identify possible reasons for such differences
  – differences in quantity and quality of linguistic experience
Conditions

• Passives
  – *The boy was kissed by the girl*
  – *The girl was kissed by the boy*

• Q-*is*
  – *Every fish is in a bowl*

• Q-*has*
  – *Every bowl has a fish in it*

• Active (control)
  – *The boy kissed the girl*
  – *The girl kissed the boy*
Experiment 1: Participants

50 adult native speakers of English

• 19 participants - postgraduate students (HAA - 17 years of formal education)
• 31 participants - shelf stackers, packers, assemblers (LAA - max. 11 years formal education)
Experiment 1: Materials

The boy kissed the girl/The girl kissed the boy

The boy was kissed by the girl/The girl was kissed by the boy
Experiment 1: Materials

Every fish is in a bowl/Every bowl has a fish in it
Experiment 1: Prediction

• Frequency (BNC)
  – Q-has (*Every NOUN has a NOUN PREP it*): 0 instances
  – Q-is (*Every NOUN is PREP a NOUN*): 8 instances
  – full passives: 5675 instances
  – active transitive: 120,000 instances

• Prediction
  – actives easier than passives
  – passives easier than Q-is
  – Q-is easier than Q-has
Experiment 1: Results

active > passives (z = -2.62, p = 0.026)
passives > Q-is (z = -4.28, p < 0.001)
Q-is > Q-has (z = -4.18, p < 0.001)
Performance v Competence

• Results reflect large (education related) differences in underlying linguistic knowledge NOT performance factors
  – interviews: very informal, plenty of time to answer questions, at place of work/study
  – test-wiseness: evident across conx (LAA at ceiling on actives
  – easy task: 2-year-olds can do it!
Experiment 2

Training study

• Comprehension of same conx as Exp 1 before and after training (see Chipere 2001)

• Half participants trained on passive, half trained on Q-has
Experiment 2: Prediction

• Training leads to selective improvement in performance
  – Passive group improve on passive but not quantifiers
  – Quantifier group improve on Q-has but not passives

• Quantifier group improve on Q-is?
Experiment 2: Participants

- 54 adult literacy students (Skills for Life)

- 5 levels:
  - 1-3 entry levels - very basic skills
  - Level 1 & 2 - equivalent to GCSE pass/good pass
Experiment 2: Materials

Four versions of test used in Exp 1

• Version 1 same as Exp 1
• Versions 2, 3 and 4
  – same verbs and universal quantifiers as Exp1 but different NPs
Experiment 2: Procedure

6 stages:

• Pre-test
  – to select low scoring (i.e. 4/6 on three experimental conx) participants
• Training (1 week after pre-test)
• Post-test 1 (immediately after training)
• Post-test 2 (1 week after training)
• Post-test 3 (approx. 12 weeks after training)
• Reading and Need for Cog questionnaire
Pre-test results (N=54)

actives > passives: (z = -4.92, p < 0.001)
passives > Q-is: (z = -4.28, p < 0.001)
Q-is > Q-has: (z = -3.68, p < 0.001)
Post tests: Passive group (N=8)
Passive group (N=8)

- Actives > Q-is: $(z = -2.53, p=0.033)$
- Actives > Q-has: $(z= -2.55,p = 0.033)$
- Active - Passive: $(z = -1, p=0.951)$
Passive group (N=8)

- Actives > Q-is: (z = -2.53, p=0.033)
- Actives > Q-has: (z= -2.55, p = 0.033)
- Active - Passive: (z = -1.73, p=1)
Passive group (N=7*)

- Actives > Q-is: (z = -2.41, p=0.048)
- Actives > Q-has: (z = -2.41, p = 0.048)
- Active - Passive: (z = -1.73, p=1)
Quantifier group (N=9)

- Actives - Q-is: \(z = -1.34, p = 0.54\)
- Actives - Q-has: \(z = 0.00, p = 1\)
- Active > Passive: \(z = -2.69, p = 0.021\)
Quantifier group (N=9)

- Actives - Q-is: ($z = -1.73, p = 0.25$)
- Actives - Q-has: ($z = -1.89, p = 0.18$)
- Active > Passive: ($z = -2.80, p = 0.015$)
Quantifier group (N=7*)

- Actives - Q-is: (z = -1.00, p = 0.93)
- Actives - Q-has: (z = -1.73, p = 0.95)
- Active > Passive: (z = -2.46, p = 0.042)
The Untrained Condition

No significant improvement on untrained condition BUT…

- Q-has improved on Q-is
  - Variants of same construction? - i.e., NP BE PREP LOCATION/LOCATION HAVE NP PREP *it* - unlikely given pre-test results
  - Participants draw inferences about Q-*is* meaning because implicitly contrasted with Q-*has* in training?
Reading & Need for Cognition

- Overall test score
  - Amount of reading: \( \rho = 0.551, p < 0.001 \)
  - Need for Cog: \( \rho = 0.576, p < 0.0001 \)

- Passive score
  - Amount of reading: \( \rho = 0.529, p < 0.001 \)
  - Need for Cog: \( \rho = 0.404, p < 0.005 \)

- Quantifier score
  - Need for Cog: \( \rho = 0.606, p < 0.001 \)
  - Amount of reading: \( \rho = 0.520, p < 0.001 \)

- Z-tests for two correlation coefficients
  - Passive score: \( z = 3.53, p < 0.001 \)
  - Quantifier score: \( z = 2.78, p = 0.005 \)
It’s only a correlation, but….

- Amount of reading more relevant for development of knowledge of passive?
  - (relatively frequent in written texts)
- Need for cognition more relevant for development of knowledge of quantifiers?
  - (quantifiers play important role in logical reasoning (Braine and O’Brien 1998))
Summary: Exp1

- Education related diffs in knowledge of passives and quantifiers
- NB some LAA at ceiling even on Q-has
- Diffs due to amount of linguistic experience
Summary: Exp2

• Training results in significant improvement on conx
  – evidence that constructional schemas emerge as result of experience
  – poor performance on pre-test NOT due to lack of attention, working memory capacity etc.
Why education-related differences?

Quantitative diffs in linguistic experience

• less educated speakers have less relevant experience?

• more educated speakers get more exposure to language overall
Eureka!

Qualitative diffs in linguistic experience

• more educated receive more exposure to explicit explanation of language as children?
  – evidence from L2 (instruction jump starts implicit learning - Ellis 2005)
  – ‘eureka’ experience of participants during training
Need more; get less?

- LAA less efficient language learners
  - correlation: reading & need for cog with comprehension score

- Combination of factors
  - LAA need more experience BUT get less
Conclusions

• Vast individual performance differences on tasks tapping knowledge of basic linguistic constructions

• Cannot be explained by appealing to:
  – working memory capacity, test-taking skills, or willingness to cooperate with experimenter

• Differences strongly correlated with education
  – experience with (written) language, Metalinguistic skills, IQ/verbal ability?, Motivation to learn/curiosity?
Some implications

• Usage-based theories: Entrenchment
• Methodology: *which* adult control group?
• Social and educational policy
• Generative linguistics: raise doubts about one of the most widely accepted arguments for an innate UG
• Learners need more experience than is often assumed
References