Main point: questions the common formulation of the critical period hypothesis that younger is always better in L2A

BACKGROUND

Critical Period Hypothesis (Lenneberg 1967):

"...primary language acquisition must occur during a critical period which ends at the age of puberty with the establishment of cerebral lateralization of function."

This implies that language acquisition after puberty will be different from (i.e. slower than, not as successful as) normal first language acquisition prior to puberty

Evidence that that critical period hypothesis (as formulated) might be wrong:

1) Case studies of first language acquisition after puberty:
   a) Buddenhagen (1971) - successful acquisition at age 18 by a previously mute mentally retarded individual
   b) Genie - abused girl isolated from human interaction until age 13 (sigh); acquisition lexically good but syntactically incomplete
   c) Vargha-Khadem F; Carr LJ; Isaacs E; Brett E; Adams C; Mishkin M. (1997). ‘Onset of speech after left hemispherectomy in a nine-year-old boy’. Brain 120 (Pt 1), pp. 159-82.

Abstract: Case Alex, with Sturge-Weber Syndrome affecting the left hemisphere, failed to develop speech throughout boyhood, and his comprehension of single words and simple commands remained stagnant at an age equivalent of 3-4 years. But then, following left hemidecortication at age 8.5 years and withdrawal of anticonvulsants when he was more than 9 years old, Alex suddenly began to acquire speech and language. He also showed an unusual degree of residual motor capacity on his right side. Alex’s remarkable progress in learning speech and language, and the development of his other cognitive abilities, were measured periodically from the age of 9 to 15 years. His most recent scores on tests of receptive and expressive language place him at an age equivalent of 8-10 years. Comparison with the level of function attained in these domains by nine other left hemispherectomized patients with early onset of disease and comparable IQ (range, 40-68) but with early development of speech and language, suggests that, surprisingly, Alex has suffered no permanent disadvantage from his protracted period of mutism and severely limited comprehension. Although the findings in Alex,
as in other left-hemispherectomized patients, indicate defined limits to the
cognitive and linguistic capacity of the isolated right hemisphere. Alex’s
achievements appear to challenge the widely held view that early childhood
is a particularly critical period for acquisition of speech and language or
any of their selective aspects, including phonology, grammar, prosody and
semantics. It is concluded that clearly articulated, well structured, and
appropriate language can be acquired for the first time as late as age 9
years with the right hemisphere alone.

2) Second Language Acquisition Studies

a) first and second language acquisition are similar in terms of

i) acquisition order of rules and structures

ii) learning strategies

iii) error types

b) older children are faster than younger children in acquiring

- morphology and syntax
- listening comprehension

(results mixed on acquisition of phonology)

Why it would be premature to reject the critical period hypothesis outright:

1) no study has investigated the entire age range (3 years to adulthood) 2) previous studies have been
cross-sectional (i.e. one point in time) rather than longitudinal 3) only limited language skills have been tested
(this may explain the phonology results)

The present study:

51 English-speaking subjects in five age groups followed for a period of one year All subjects learned
Dutch by "picking it up" at work or school, with little or
no formal instruction

Compared with

a) advanced L2 speakers of Dutch
b) native speakers of Dutch

METHODS

Subjects

Beginners - English speakers starting to learn Dutch (tested three times at
4-5 month intervals)

10  3-5 years
8   6-7 years
13  8-10 years
Advanced - English speakers living in Holland and speaking Dutch for at least 18 months (tested only once)

- 6 6-7 years
- 6 8-10 years
- 8 12-15 years
- 10 adults

Native - monolingual Dutch speakers of average intelligence and verbal ability from the same middle-class area most of the test group individuals were from

- 8 6-7 years
- 8 12-15 years

- Age groups not matched for social class, IQ, exposure to Dutch BUT majority were from middle-class families
- Four younger age groups showed no IQ differences; adults not tested for IQ
- Adults had less exposure to L2 than children, who were in school

Tests (designed to be fair to younger subjects by keeping the content as simple as possible)

- Pronunciation: imitate words spoken by a native speaker, and then repeat with delay and without further input scored on a scale of 0-5 by a native speaker; rescored 8-9 months later (by same native speaker??) with 89% agreement

- Auditory discrimination: selection of correct picture after hearing minimal pairs (e.g. man ‘man’ vs. maan ‘moon’)

- Morphology: test for plural, diminutive, agentive, past tense, past participle, and final devoicing of singulars from plurals, first using real words, then using nonsense words (“wug” test)

- Sentence repetition: repetition of sentences of increasing length and grammatical complexity read aloud; vocabulary kept simple in order to test syntactic structure; scored on number of words correctly produced

- Sentence translation: translation of sentences of increasing length and grammatical complexity; help provided for vocabulary in order to test syntactic ability; scored for correct grammatical structure and word order
Sentence judgement: selection of correct sentence from pairs read aloud

Peabody Picture Vocabulary Test: selection of correct picture out of four (PPVT) after word read aloud (designed for Dutch native speakers up to age 8; 3-5- and 6-7-year-olds analyzed separately from other groups)

Story comprehension: tape-recorded story played to subjects, who were asked to retell it in English; scored for 30 key story points

Storytelling: telling a story on the basis of pictures in both English and Dutch scored number of words per second

RESULTS

1) In general, beginners improved between each testing session (with the exception of auditory discrimination between times 2 and 3)

2) Group differences (beginners vs. advanced) at time 3 only for adults on auditory discrimination, sentence repetition, and sentence translation; this means 6- to 15-year-olds had essentially reached ceiling in one year

3) Significant age differences at time 1 for all tests (except the imitation portion of the pronunciation test) favored older subjects over younger

   most proficient: 12-15 adults
   8-10
   6-7
   least proficient: 3-5

Spontaneous pronunciation showed a linear increase in scores with age

4) Age differences at times 2 and 3 smaller but still significant, with the exception of pronunciation at both times, and auditory discrimination at time 2

5) 8- to 10-year-olds surpassed the adults in auditory discrimination, sentence repetition, sentence judgement, story comprehension, and spontaneous speech fluency by time 2, and in morphology and sentence translation by time 3

6) 6- to 7-year-olds surpassed the adults in spontaneous speech fluency and auditory discrimination
by time 3

7) 6-7 better than 3-5
   12-15 and adults better than 8-10
   at all three test times

Evaluate the following observations very carefully:

"All the tests, then, except Pronunciation, on which the age differences disappeared very quickly, showed a similar pattern: most rapid learning by the 12- to 15-year-olds and adults during the first few months of acquisition, those preceding the first test session, and by the 6- to 10-year-olds during the last three quarters of the first year. The adults, despite their initial rapid acquisition, fell increasingly behind because their subsequent improvement was very slow. The teenagers had achieved almost native performance extremely quickly, within a few months of starting to speak Dutch. They maintained superiority on most tests because their initial advantage was so great; they were, however, surpassed on Story Comprehension and Spontaneous Speech Fluency by the 6- to 10-year-olds.

The crucial findings of relevance for the CPH were that the 3- to 5-year-olds scored consistently worse than the older groups on all the tests and that the 12- to 15-year-olds showed the most rapid acquisition of all the skills tested. These findings are basis for rejecting the hypothesis that the period 2 to 12 years constitutes an optimal time for language acquisition."

8) Also within families, younger children did not surpass older children and adults

9) In comparisons with native speaker groups of equivalent ages, 12- to 15-year-olds outperformed 6- to 7-year-olds on all tests except sentence judgement at test time 1; 6- to 7-year-olds also surpassed the 12- to 15-year-olds in story comprehension and the PPVT by test time 3

The authors attribute the story comprehension differences to attitude in the older group (the stories were not age appropriate for them)

BUT notice the rate of improvement in the 6-7 group across the test times in Table 2 relative to the rate of improvement in the 12-15 group

10) The authors argue against an explanation of the results based on more positive transfer from English for older children:

   a) the similarities of Dutch and English are in vocabulary, not in syntax, morphology, or phonology, so older children should have a vocabulary advantage -- but it is in syntax and morphology that younger children do worse

   b) if older children are using positive transfer to outperform younger children, then they should do better on those aspects of Dutch syntax and morphology that are more like English (such as main clause word order), but this was not the case (all age groups tended to use verb-final order in Dutch main clauses)
De patient bezoekt de doktor.
the patient visits the doctor
‘The patient is visiting the doctor.’ OR
‘The doctor is visiting the patient.’

De patient heeft de doktor bezoekt.
the patient has the doctor visited
‘The patient visited the doctor.’ OR
‘The doctor visited the patient.’

De patient, die de doktor heeft bezoekt.
the patient who the doctor has visited
‘The patient who visited the doctor.’ OR
‘The patient who the doctor visited.’

11) Similar patterns and orders of syntactic and morphological acquisition observed across all age groups

DISCUSSION

"The results of this study fail to support the CPH. The fastest second language acquisition occurred in subjects aged 12 to 15 years, and the slowest occurred in subjects aged 3 to 5 years. Furthermore, subjects of all ages were very similar in the aspects of Dutch they found difficult and those they found easy. At least as far as second language acquisition is concerned, then the conclusion must be drawn that a critical period extending from age 2 to age 12 does not exist."

Lenneberg’s primary evidence for the CPH was based on children’s recovery from aphasia; however, it is not clear that children always recover, or that younger children recover better than older children.

These results are compatible with the hypothesis that cerebral lateralization is established between birth and five years of age, and that the critical period for first language acquisition ends at age five, but does not affect second language acquisition in children older than five, because:

1) the effort required to learn L1 impairs acquisition of L2, OR
2) having mastered L1 makes acquisition of L2 easier, OR
3) the establishment of cerebral dominance facilitates L2 acquisition

Only 3- to 5-year-olds showed deterioration of English while learning Dutch.

There was lots of individual variation in acquisition of L2 skills, and dissociations in mastery of different aspects of the target language within the same individual.

"Evidence concerning such variation is important to an assessment of the CPH because if native speakers who have had all the advantages of full critical-period exposure to the first language do not achieve equal skill, then the fact that post-critical-period learners show a range of skill is not surprising."