

1) Introduction

The argument for internal constraints on language acquisition is based on evidence of the following sorts:

a) the logical problem: input underdetermines outcome

[how sure are we of this? -- RK]
[how do we assess competence? -- RK]

b) existence of language universals: convergence on particular outcomes, non-occurrence of possible (nonhuman) languages

[possible in what sense: *logically*? -- RK]
[convergence due to language-specific constraints or to more general constraints? -- RK]

Newport’s particular interest:

c) maturational constraints on language acquisition: given similar input [this is always questionable -- RK], learners of different ages produce different outcomes

N.B. evidence for the *existence* of maturational constraints does not unequivocally reveal their precise nature

Paradox: in most developmental domains, big kids are better than little kids [and possibly in language learning as well; cf. Snow and Hoefnagel-Hoehle]

in language acquisition, children are better than adults

2) Maturational Constraints in First Language Learning

Reasons for studying sign:

a) different modality, yet with all the properties of human language b) often acquired late even as a first language

age of acquisition varies widely among deaf signers:

- only 5-10% of deaf are born to deaf parents, exposed to sign from birth
- remainder born to hearing parents, with effectively no language input in infancy and early childhood (but these individuals
usually do acquire some knowledge of English at least in school.
- first exposure to sign in residential schools for the deaf,
  usually around 4-6 years of age, but sometimes even later

Subjects:

- congenitally or pregenitally deaf adults whose primary language is ASL,
  with limited skills in English
- all the attended the Pennsylvania School for the Deaf at a time when
  signing was prohibited in the classroom; thus those not born to deaf
  parents acquired ASL naturalistically in the dormitories
- all interact socially within the deaf community of Philadelphia
- 35 to 70 years old at time of testing
- minimum of 30 years’ daily exposure to ASL

30 subjects divided into three groups according to age of first exposure
to ASL:

a) native learners - exposed to sign from birth by their deaf parents,
   and subsequently from ages 4-6 by other children at the school
   for the deaf
b) early learners - exposed to sign from ages 4-6 (when they entered
   the school for the deaf) by their deaf signing peers
c) late learners - exposed to sign after age 12, either when they
   entered the school or met individuals who themselves had attended
   the school

Procedure:

Various test batteries, both production and comprehension, of ASL
morphology and syntax

Production: series of short videotaped events which the subjects
must describe in ASL

Comprehension: series of short videotaped ASL signs or sentences
which the subjects must respond to by manipulating
an object or choosing an appropriate picture

(see Newport 1990, pp. 15-16 for examples)

Results:

Quantitative:

a) All subjects close to ceiling in basic word order
b) Scores on tests of morphology show consistent and significant
effects of age of acquisition

    native > early > late

Qualitative: late learners exhibit

- frozen signs, i.e. unanalyzed whole word signs
  with no apparent internal morphological structure

- inconsistency on test items requiring the same morpheme

- omission of obligatory morphemes

Effects not due to length of exposure to ASL

3) Maturational Constraints in Second Language Learning

Study of ultimate attainment of morphology and syntax of English

Subjects:

- 46 native speakers of Chinese or Korean
- all students or faculty at University of Illinois
- minimum residence of 10 years in U.S.; minimum unbroken stay of three
  years in the U.S. prior to testing
- age of arrival ranged from 3 to 39 years

46 subjects divided into two groups according to age of arrival in U.S.:

a) early arrivals - arrived in the U.S. prior to age 15

    23 subjects, 12 males and 11 females
    unspecified number of years of schooling in the U.S.
    average of 9.8 years in the U.S.
    for the most part, undergraduate students at U of I
    native language spoken at home (prior to college), English outside

b) late arrivals - arrived in the U.S. after age 17

    23 subjects, 17 males and 6 females
    2 to 12 years of formal English instruction in home country
    (thus age of first exposure antedated age of arrival)
    3 to 10 years of schooling in the U.S. (average 6)
    average of 9.9 years in the U.S.
    for the most part, professors, research associates, and graduate
    students at U of I
    for some, native language spoken at home; for others, esp.
    unmarried subjects, language environment almost entirely
    English (i.e. no apparent advantage for early arrivals on
Procedure:

Competence assessed by scores on a grammaticality judgement test of 12 morphological or syntactic structures in English subsequently normed on 6- and 7-year-old native speakers, who got near perfect scores.

Subjects heard 276 recorded English sentences, half of which were grammatical; "...the other half, randomly interspersed, were each exactly the same as one of the grammatical sentences, except that they contained a single violation of an obligatory grammatical pattern of colloquial English." (Newport 1990, p. 19)

Each member of a pair occurred in a different half of the test

Forced-choice task (circling "Y" for yes and "N" for no on answer sheet)

Post-test interview to determine language background, motivational, and attitudinal variables

Materials:

Structural types included:

1) past tense formation (regular [?] and irregular)
2) noun pluralization (regular and irregular)
3) third person singular inflection, simple present
4) present participial inflection, present progressive
5) use of determiners (definite and indefinite)
6) pronominalization (nominative vs. accusative, gender and number agreement, adjective vs. nominal in possessives ["her" vs. "hers"])
7) verb particle placement (particle vs. preposition ["call up" vs. "climb up"], illicit movement of particle ["call for a date up"])
8) subcategorization (NP vs. PP complements, verbal infinitival complements ["allow to watch" vs. "let watch"])
9) auxiliaries (perfect and progressive formation, only first auxiliary finite ["should have" vs. "should has"])
10) yes/no questions (verb movement ["Has X been?" vs. "Has been X?", "Can X say?" vs. "Can say X?", "Did X go?" vs. "Went X?"])  
11) wh-questions (verb movement ["What do they sell?" vs. "What they sell?"])  
12) word order (rearranging arguments in relation to the verb ["Martha a question asked the policeman"])

6 to 16 pairs of sentences testing each structural type

Results:

Native controls and 3- to 7-year-old arrivals performed equivalently
Johnson and Newport (1989, p. 96) point out that this finding differs from that of L1 acquisition, where declines were seen already in the early ASL learners (i.e. deaf of hearing entering a school for the deaf between the ages of 4 and 6) relative to native learners (i.e. deaf of deaf).

"It is possible that a similarly early decline may occur in second language acquisition as well on a test that included more complex aspects of syntax than our own...."

"Further research is therefore necessary to determine with certainty the exact point at which a decline in learning begins for second language acquisition." (Johnson and Newport 1989, p. 96)

All other age-of-arrival groups differed from native controls and from 3- to 7-year-old arrivals, as well as from each other.

Early arrivals (see "Subjects" above) showed a steady decline in performance with increased age of arrival; late arrivals showed no systematic correlation between age of arrival and performance, but as a group performed worse than early arrivals.

Interpretation: if these effects hold only during life stages in which maturation plays a role, i.e. before but not after age 17, then that indicates that they are maturational in character.

if they were to decline steadily across the adult years, that would indicate that they were not maturational in character (in the above sense)

i.e. the different lines of regression before and after age 17 (r = -.87 vs. r = -.16, N.S.) point to two different mechanisms of explanation

"...the effects over age are approximately linear through childhood, with a flattening of the function in adulthood." (Newport 1990, p. 20)

Objection: Chapter 4 of *Rethinking Innateness* challenges this linear interpretation, which accounts for 39% of the variance, with a non(curvi-)linear interpretation that accounts for 63% of the variance.

"...the ‘two-state’ maturational effects described by Johnson and Newport can be fit by a theory in which two simple mechanisms constantly compete to produce a smooth curve of changing slope. The changes are all determined by the direct response of the learning system to the constant environment and the periods of rapid versus slow change are determined by the state of the learning system itself, and not by any system external to it." (pp. 187-188)
this model does not account for the marked increase in the variance after age 16, however

No significant correlations between test scores and:

- length of exposure to English (number of years in the U.S.)
- amount of initial exposure during the first year or two in the U.S.
- age of exposure to English in a formal classroom setting
- length of exposure to English in a formal classroom setting
- motivation to learn English in a formal classroom setting

There were significant correlations between test scores and attitudinal variables:

- identification with American culture \(r = .63\)
- self-consciousness while learning English in the U.S. \(r = -.36\)
- motivation to speak English well plus intention to remain in U.S. \(r = .39\)

However, these variables also correlate significantly with age of arrival
So this is a chicken-and-egg problem: which is the better measure?

the correlation between age of arrival and test score \(r = -.77\)
is stronger than any of the correlations between test score and attitudinal variables given above

attitudinal variables are more adversely affected when age of arrival is partialed out than is age of arrival when each of the attitudinal variables is partialed out

age of arrival accounts for additional variance when added to a regression analysis combining all three attitudinal variables

thus age of arrival has an effect on 2LA over and above attitudinal variables

However, both identification and self-consciousness also account for additional variance when added to a regression analysis including only age of arrival, or age of arrival plus the other attitudinal variable

Nonetheless, age of arrival remains an independent factor

Moreover, age of arrival correlates with test scores on *each* of the 12 structures included in the study

Analysis revealed that some of the 12 structural types tested caused more difficulty particularly for late learners than other structural types did (Fig 3. on p. 87 of Johnson and Newport 1989)

progressive ‘-ing’ the least troublesome, followed by word order
(most subjects got all test items correct on these structures)
N.B. Newport (1990) suppresses the progressive data in favor of word order

cf. order of morpheme acquisition studies (where for example progressive ‘-ing’ is always acquired early)

See also subjacency study (Johnson and Newport 1991)

4) The Nature of Maturational Constraints

Paradox: in most developmental domains, big kids are better than little kids

in language acquisition, children are better than adults

Why?

Two possible classes of explanation:

a) domain-specific knowledge of constraints on possible forms of human language

"To account for a maturational decline in language learning within this framework, one might suppose that this language faculty is entirely intact only early in life, and then undergoes decay or deterioration as maturation continues. On such a view, later language learners show less success in acquiring their language, and more variable mastery of its rules, because the constraints which permit successful acquisition are weakened." (Newport 1990, p. 22)

==> but not eliminated (cf. fn. 4)

N.B. this *should* be compatible with UG-in-L2 views, but for some reason appears not to be (presumably because it precludes the strong version of the theory?)

On this account, the inverse relationship between cognitive abilities and language learning is accidental

b) language learning declines over maturation BECAUSE cognitive abilities increase (the "Less is More" Hypothesis): the limited cognitive abilities of children foster successful language learning

Evidence: ASL late learners’ errors

- frozen signs, i.e. unanalyzed whole word signs with no apparent internal morphological structure

- inconsistency on test items requiring the same morpheme (apparently random variation)
"Both of these types of errors suggest that late learners have experienced problems in consistently and uniquely analyzing the complex structures of the language, and have either failed to analyze, or have learned more than one analysis for the same structure." (Newport 1990, p. 23)

Evidence: native learners’ errors

- componential errors, where structures are produced only in part, with whole morphemes omitted

N.B. that the *third* type of late learner error was also omission of obligatory morphemes!

Over time, native learners add morphemes, while late learners either maintain holistic forms or overgeneralize the patterns of a few of these forms

Hypothesis: this results from differences in the way children and adults perceive and store input, rather than from differences in knowledge of linguistic constraints or in ability to perform linguistic analysis on stored input

in particular, children and adults differ in their ability to perceive and remember complex stimuli: adults can obviously take in and remember more

The more limited abilities of children may provide an advantage for tasks (like language learning) involving componential analysis

If children are able to perceive and store only component parts rather than complex wholes, they may be better able to isolate the components necessary for recombination

Two advantages:

a) number of computations to perform is greatly reduced, and focused on morphological rather than whole-word mappings of form and meaning

b) relevant units of form-meaning mapping may be perceptually highlighted (instead of being arrived at via computational means)

N.B. these advantages accrue only if the task is one of componential analysis; here adults will have (a) more computations to perform, and (b) find more potential analyses consistent with the input

N.B. this bears on our discussion last week regarding the ability of adult L2 learners to recover from periods of reanalysis, as in the passivization of unaccusatives in adult L2: do they show the upswing of the traditional U-shaped learning curve, or do they simply nosedive and never recover (in
Newport’s terms, because of the disadvantages they face in componential analysis and recombination)?

cf. Krashen’s (1982) and Rosansky’s (1975) claims that adults do worse at 2LA because of the onset of the Piagetian stage of formal operations

For tasks that require integration and/or complex wholes, adults should outperform children (e.g. adults should excel at whole word learning)

There may be other differences as well

This also makes sense in terms of the evolution of the species in the direction of prolonged infancy

(but note that this is another chicken-and-egg story, insofar as prolonged human infancy is due to ongoing post partem neural development, or in other words, human children are born before the nervous system has fully developed because otherwise their heads could not possibly pass the birth canal; this clearly has implications for the ability to acquire skills like language WHILE THE NERVOUS SYSTEM IS STILL DEVELOPING)

In regard to exceptional language learners:

"For adult learners, age does not continue to be a predictor of performance; thus any proposed mechanism accounting for adult performance likewise cannot be correlated with age. Moreover, while early learners are uniformly successful in acquiring their language to a high degree of proficiency, later learners show much greater individual variation (see also Patkowski, 1980, for related comments). A theoretical account of critical period effects in language learning must therefore consider whether the skills underlying children’s uniformly superior performance are similar to those used by adult learners, or rather whether adult language learning skill is controlled by a different set of variables.” (Johnson and Newport, pp. 96-97)