Stages of ‘Rule Representation’ Scheme:

1. Phonology
   - Pre-Representational
     - Idiomatic Speech
       - [prIti]
   - Representational
     - Partial rules
     - /prIti/ [CVCV]
   - Pre-Representational
     - Formulaic
     - /bIdi/ [CCVCV]
   - Representational
     - Full rules
     - Referential
       - Noun ↔ Determiner
       - Verb ↔ Auxiliary/Modal
       - Context-bound
       - Noun ↔ Determiner
         - Verb ↔ Auxiliary/Modal
         - [car] ‘car’
         - [raisins] [raisins]-[es]
         - [ø Pl] [+Pl] [Number]
         - [formulaic] ‘category’
         - ['Ivant'] ‘I’ [Case]

Phonological Rules:
   - Assimilation
   - Default voicing
   - Syllabic Development
     - (e.g., 'u-shape learning')
   - Weak syllable deletion

Data:
- (Galasso) ‘Sally Exp’
- (Gordon) ‘Rat-eater Exp.’

Overview:
Children first produce language in a pre-representational way whereby both Phonology and Morphology are underdeveloped. Regarding phonology, idiomatic speech such as formulaic, echolalia and mimic expressions are the hallmark of a Pre-Representational stage, usually beginning as early as 14 months and lasting up until 24 months (+/-20%). Regarding Morphology, chunking has been observed whereby young children (up until 24 months) are seemingly unable to partition the morphological segments e.g., [stem-affix] and rather produce both as a single whole chunk—e.g., ‘raisins’ (as a singular word and where the plural {s} is not yet productive).
1. Phonology: Phonemic/Syllabic Development and Consonant Harmony

[1] The early production of the word 'spaghetti' offers linguists a valuable insight into the phonological rules children employ at the earliest stages of representational speech.

(p. 93) (a) spaghetti → /bʌzɡɛdi/

Above, spaghetti /spʌɡeti/ becomes /bʌzɡɛdi/ (CVC+CVCv) with initial /s/ deletion and strategic reinsertion (voiced to /z/) to create the /CVC-CVCv/ structure. Otherwise, (i) if the initial /s/ stays in place, the child is confronted with a /CC/ double consonant onset which might not be available at the given syllabic stage of development, (ii) if the /s/ gets deleted, never again to insert as /z/ for final /C/ of the initial /CVC/ structure, the child then confronts a CVC-*VCV /bʌgɛdi/ thus losing the preferred CVC proto-word template. (/p/, /t/ become voiced /b/, /d/ by default voicing).

[2] This rule-based representation is similar to what we found regarding U-shape learning of phonology: **Phonological U-shape** learning (cited from Hildegard, Leopold 1939-1949)

<table>
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<tr>
<th>Stage-1</th>
<th>Stage-2</th>
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<tr>
<td>• Pre-representational stage: (MLUw ≥2.2)</td>
<td>• Representational stage showing phonetic and syllabic representation (MLUw &lt;2.5)</td>
<td>• Target grammar (MLUw 2.8)</td>
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<tr>
<td>/prɪtɪ/</td>
<td>/blɪdɪ/</td>
<td>/prɪtɪ/</td>
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-- Double consonant CC reduced to a sole consonant onset C (= CV stage of development)
-- Default voicing assimilating the [-voice] bilabial plosives /p/ to [+voice] /b/ and alveolar /t/ to /d/.

[3] There is a child language acquisition stage during which children will engage in assimilation seemingly across vowel/consonant phoneme boundaries in an attempt to auto-segment consonants with consonants or vowels with vowels. Consider some well known examples below:

(p. 123) (a) duck /dʌk/ → guk /ɡʌk/. (velarization)

[bCv] [bCv]

(b) Because /biʌkʌz/ → /piʌkʌ/: /b/ to /p/ (due to assimilation from /k/).

[CVC] [CVC]

[4] Observed above, autosegmental assimilation (or consonant harmony/velarization) is found whereby the final consonant [+velar, +voiced/fricative] /k/ is affecting the initial consonant [+alveolar, +voiced/fricative] /d/ and making it +velar. (Hence, if you take /d/ and change its place of articulation from +Alveolar to +Velar—keeping all other distinctive features untouched—the resulting phonemic change is /d/ to /ɡ/). It is this kind of evidence that led some linguists to suppose that early children may not segment on a phoneme by phoneme level, but rather may segment and process sound input based on a syllable by syllable level or [CV] to [CV].
Phonemic Awareness

[5]. For instance, if this is indeed the case, a very young child, say at 2 years of age, may not hear and segment cat /kæ:/ as three different segmental phonemes /k/, /æ:/ and /t/, but rather may process /k/ as an initial onset and /æ:/ as a single [vowel&consonant] coda. By segmenting at a larger syllabic level, as opposed to a finer grained phonemic level, this type of autosegmental assimilation may in fact be adult-like in that there indeed are only two perceived adjacent sounds found in the assimilation process—viz., the initial Consonant and Coda /C/, /VC/. (If this is the case, we don’t have to add an additional stipulation that the child crosses over the otherwise segmented vowel boundary during assimilation).

(a) Cat [CVC] → /kæ:/ [CV] (due to syllabic development)
(b) because [CVCVC] → /pikʌ/ [CVCV] (due to voiceless assimilation /k/, /p/)
turning initial voiced /b/ to voiceless /p/ due to adjacent voiceless /k/.

[6] In [5] (a) above, the final [C] /t/ is deleted due to an immature syllabic developmental stage:

Stages of Syllabic Development

(0-18m) Pre-Representational/Pre-Linguistic

(i) [CV] (e.g., ba)
(ii) [CV;CVi] (e.g., baba) => gemination/duplication of [CV; CV]

(24m+) Representational/Linguistic

(iii) [CVC] (e.g., cat) => syllabic/proto-word template
(iv) [CV,CVi] (e.g., kitty)
(v) [CCVC]… (e.g., school) => consonant cluster

S → S (cat) → S (school)

[7] Although three allomorphic phone options are available in presenting the past tense
inflection {-ed}—
(i) /d/ as in the word (ple:d/ (played),
(ii) /t/ as in the word /klkt/ (kicked) (showing phonological assimilation), and
(iii) /ld/ otherwise as the default--children start with the /ld/ default form and maintain it up
until a certain age of development. Examples of this range from */kIkld/ (kicked),
*/brokld/ (broke), */kEpld/ (kept), */si:IId/ (saw), */kIkld/ (cooked), etc.

In other words, once children start to employ the phonological rules associated with
the past tense {ed}, they over- regularize the /ld/ pronunciation for {ed}.

[8] banana => /nænæ/ is a beautiful example of how such speech could not be based on a memory
bottle-neck of sorts (once attributed to such simplified pronunciation). Here, it is the initial
unstressed CV structure that has been deleted. Any attempt to suggest that a lack of memory is
behind such errors would undoubtedly run into trouble with this example. => weak syllable
deletion
2. Morphological Development

(p. 154) [9] Examples of Pre-Representational word category can be found in such usages as early productions of *I*want where there is seemingly no morpho-phonological segmentation of ‘I+want’. The child seems to be processing this as a chunk [‘Iwant’] + object.

[10] It was initially reported that the early onset of plural {s} as in the word raisins or ducks (p. ) were instances of formulaic speech without morphological segmentation of [stem + affix]. Evidence that this is the case comes from work such as (Berko) which show over-regularization of morphology—e.g., ‘raisines’, ‘wented’, or /kʊktld/ (= [cooked]+{ed}), /fɪktld/ (=fixed+{ed}).

(p. 141) [11] Context-bound words provide evidence that very young children may not initially classify words into ‘categories’ at all but rather may solely rely on specific semantic associations attributed to particular contexts.

[12] Distinctions in Derivational vs. Inflectional Morphology were reported as seen via our ‘Sally Exp. (Galasso) and ‘Rat-eater’ Exp. (Gordon) (below):

Words such as ‘Paint-s-er’, ‘Rat-s-eater’ are unattested in the data. Children seem to have innate knowledge of [stem+Derivation+Inflection] ordering. In compounding, only a given stem+stem can bind together, hence *Rat-s-eater is never produced. Only [Lexical+Lexical/Derivational] compounding gets spelled-out with no other Functional/Inflectional intervening affix inserting between stems. In the Gordon Exp. we noted that ‘mice-eater’ did adhere to our stem+stem/derivational rule since ‘mice’ is an irregular plural which functions as a whole/stem and where eater is a lexical product of derivational morphology.

(p.173) [13] Word Mapping (‘Tadpole-frog’ problem): Semantic bootstrapping is when children use ‘word meaning’ to later build-up syntactic categorical classes. Syntactic bootstrapping is when children used a priori knowledge of syntax to discern word meaning.

Chapter Readings Overview:

Ch. 1-2 Introduction: (Sally Experiment, Berko, Brain Processing (Broca/Wernicke’s area as correalted to specific language tasks), Brain development, Human language as opposed to animal communication.

Ch. 3 Phonology: IPA charts (minimal pairs), Phonological rules (assimilation). Phonological Categorical Perception (handout and experiment), Speech development.

Ch. 4 (Ch. 9) Morphology. Lexical vs. Functional word class and Development, Word mapping (semantic vs. syntactic bootstrapping), Derivational vs. Inflectional morphology.

Lecture Notes.