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23 On Gaps Undetectable for Language Learners

François Dell
C.N.R.S., Paris

J. Mehler, E. C. T. Walker & M. Garrett, eds., 1982, Perspectives on Mental Representations. Hillsdale: Lawrence Earlbaum.

During the first years of their lives, children learning their mother tongue are exposed to a huge number of well-formed sentences, but they are provided with very little "negative" information, i.e., information about what sound sequences are not well-formed (cf. Braine 1971). This fact can help us to gain some insights into the workings of children's language acquisition capacity. In Dell (1981) I discussed some of its implications concerning the way optional phonological rules are acquired.[1] These had to do with the manner in which the language acquisition device (henceforth LAD) evaluates alternative hypotheses concerning the structural description of such rules, and their relative ordering in the grammar. In this article I extend my argument to the acquisition of exceptions and I furthermore suggest that under certain assumptions about the way the LAD stores primary linguistic data, some gaps in these data are undetectable for it.

French has a rule, call it LIQ, by which a word-final liquid optionally drops if preceded by an obstruent and followed by a pause or a consonant, e.g. *faut l'éteindre* "you've got to put it out" can be pronounced [foletɛ̃d], et *éteindre les feux* "to put out the fires" can be pronounced [etɛ̃dəlefö][2] or [etɛ̃dlefö]. The rule applies more frequently in fast and/or relaxed styles of diction, but its application is not compulsory even in the most informal styles.

[1]Its implications for general syntax are discussed in Baker (1978; 1979). For general assumptions about language acquisition, I follow Chomsky (1965, esp. 25–47; 1975).

[2]Shwa is inserted by rule EPEN, cf. below. Setting irrelevant details aside, the underlying representation of *éteindre* is /etɛ̃dr/, and more generally, all the words that show up phonetically as [XCC] before a pause have an underlying form /XCC/.

Furthermore, even in the most informal styles, not all words meeting the conditions of that rule can undergo it. According to my intuitions as a native speaker, the words *livre* "book," *exemple*,[3] *ministre, arbre* "tree," *souffle* "blow," can for instance lose their final liquid when in the proper environment, whereas *ivre* "intoxicated, wild," *ample* "roomy," *rustre* "poor," *pourpre* "purple," *buffle* "buffalo," cannot. Taking *livre* and *ivre* as representatives of those two classes, one has the following pattern.

(1)	(a)	(b)	(c)	(d)
	[livr]	[liv]	[ivr]	*[iv]

I have not found any set of phonological, morphological and/or syntactic criteria that would enable us to set the two classes apart. Apart from the fact that common words as a rule can undergo LIQ whereas rare words cannot, the ability of words ending in an obstruent-liquid cluster to lose their liquid seems to be a matter of lexical idiosyncrasy.[4] Assume for the time being that items like *ivre* are idiosyncratically marked [− rule LIQ] in the lexicon. Assume furthermore that LIQ is a major rule,[5] i.e. that it belongs to a class of rules for the acquisition of which learners apply the following strategy:

(2) Given rule R and any lexical item I, assume that the lexical entry of I contains the specification [+ rule R] until you find evidence to the contrary.

Looking at things from the point of view of acquisition, one might ask what process results in a [− rule LIQ] marking getting entered into the lexicon of the language learner.

The evidence pointing to the exceptionality of *ivre* with respect to LIQ is all of the "negative" sort of (1d). Imagine a child exposed to the speech of adults who sometimes say [liv] for *livre* but never say [iv] for *ivre*. She hears forms like (1a, b, c), but she has no way to decide whether the absence of form (1d) from the data is due to its ungrammaticality or whether it simply is an accident. We must conclude, then, that the exceptionality of *ivre* and the like with respect to rule LIQ must have been explicitly pointed out to her in one way or another.

More generally, leaving the particular example of rule LIQ, which is used here only by way of illustration, my point is that mere exposure to a sample, however large, of adult language, does not provide the child with evidence sufficient to enable her to acquire lexical exceptions to a major optional

[3]French translations are omitted when transparent.

[4]For some discussion of the distribution of the exceptions to LIQ in the lexicon, cf. Dell (1976).

[5]On the distinction between major and minor rules in phonology, cf. Lightner (1968).

rule. Entering such exception markings into the lexicon necessarily involves some item by item teaching.

In the case of a major optional rule where one knows for a fact that no such teaching is involved, positing [− rule R] markings in the lexicon cannot be an adequate account for the immunity of certain lexical items to the rule. This is in fact the case with LIQ. The unacceptability of pronunciations such as [iv] for *ivre* cannot have been taught by adult corrections of the child's "mistakes" during the preschool period, since, as argued in Braine (1971), these play at best a minor role in language acquisition and since most words of the *ivre* type are first encountered through exposure to written material anyway. Moreover it cannot have been done later on through formal teaching, for from a normative point of view, the operation of LIQ is equally forbidden in all words as "sloppy," "vulgar," and so on. One is then forced to conclude that native speaker's intuitions such as mine as to which words can undergo LIQ and which ones cannot, are not the result of any item by item teaching.[6] Rather, they are the product of an interaction between phonological and stylistic factors that have yet to be worked out (cf. Dell, 1970; 1976).

In the preceding, I stated that the absence of the pronunciation [iv] (for ivre) from the primary linguistic data is not unequivocal evidence as to its ungrammaticality, and it may sound as though this is the only reason why language learners should not be able to infer that ungrammaticality from the data.

But it seems to me that a LAD working under the assumption that LIQ is a major rule cannot even detect the absence of [iv] from the data to begin with.[7] In order to do this, it would have to search through a complete record containing every phonetic variant of all the words it has ever been exposed to since it adopted rule LIQ. But the LAD cannot be keeping such a record as this would imply attributing to it a capability for the storage of primary linguistic data that is otherwise unmotivated. I assume that the LAD records the primary linguistic data it encounters in something like the following way.

Let us view the progression of learning as a succession of grammars $G_1 \ldots . G_k$, where for every state i, exposure to a new set of primary

[6]In order to avoid that conclusion, one could assume that LIQ is a minor rule, i.e., one for which the LAD uses, instead of strategy (2), the strategy derived from it when one replaces "[+ rule R]" by "[− rule R]". But this assumption is contradicted by the fact that speakers extend the operation of LIQ to words which are uncommon in the speech of other speakers, and which are usually not subject to the rule, if these words become very frequent in their own speech, as, for example, when *engendrer*, "to generate," drops its liquid in the speech of a linguist.

[7]The argument below about the undetectability of certain gaps can be carried over, *mutatis mutandis*, to the gaps discussed in Dell (1981).

linguistic data leads to the replacement of G_i by G_{i+1}. Consider a LAD currently equipped with grammar G_i that encounters some primary linguistic datum d. If d is not accounted for by G_i, I assume that the LAD records it in its memory so as to take it into consideration when looking for a successor to G_i. But if d is accounted for by G_i, I assume that it leaves no trace in the LAD's memory (and hence will have no influence on the choice of G_{i+1}). I assume furthermore that when the LAD adopts a new grammar G_{i+1}, it erases from its memory all the previously recorded data that is accounted for by G_{i+1}. In other words, a piece of primary linguistic data remains stored in the memory of the LAD only as long as the LAD has not reached a grammar accounting for it. Here is another point where the analogy between a language learner and a linguist trying to discover the grammar of a language breaks down. As pointed out in Braine (1971), the linguist has at any moment access to a complete record of all the data she has ever encountered,[8] whereas the child does not.

To summarize, assuming that in some cases the LAD searches through the data for gaps of a specific nature,[9] its limited ability for storing primary linguistic data puts restrictions on the kind of gaps it can detect in principle. It cannot for example perceive gaps resulting from lexical exceptions to major optional rules. It is important to understand that there is no absolute sense in which the absence of X from the data constitutes a "gap." The notion of "a gap in the data" is relative to certain hypotheses entertained by the LAD. For instance, the absence of [iv] from the data constitutes a gap under the assumption that LIQ is a major rule, but it does not under the assumption that it is a minor rule. When the absence of X from the primary linguistic data is what is expected by the LAD, there is no need to bother about how the LAD might go about to detect this absence, as can be seen from the following example.

The grammar of an adult speaker of Tagalog excludes morpheme-final consonant clusters, which implies that the absence of any such consonant cluster from the primary linguistic data has had an effect on the LAD during the period of learning. Given current knowledge about the phonotactics of many languages and about the acquisition of phonology by children, let us speculate that when a LAD starts learning a language, its initial hypothesis is that all forms of that language conform to the strongest possible restrictions on consonant clusters (e.g. they must all fit into a CVCV . . . pattern), and that it subsequently relaxes its restrictions only to the extent that it is forced to do so by violations encountered in the primary linguistic data, e.g., it will not entertain as a hypothesis a grammar allowing clusters of three consonants unless it has encountered a certain amount of such clusters in the data it was exposed to. In the case of Tagalog, then, the absence of certain data in the primary linguistic data (namely, the nonexistence of morpheme-final consonant clusters) has an influence on the LAD's choice of successive grammars because presumably the absence of such data constitutes the "unmarked" case. This absence is already built in, as it were, in the first grammar entertained as a hypothesis by the LAD, and will be inherited by subsequent grammars hypothesized by the LAD in the course of language acquisition.

[8] As any linguist keeping fieldwork notes knows, the retrievability of any individual recorded datum decreases very quickly as the global amount of material recorded increases. It is often more efficient for the linguist to elicit new data from her informants, even at the cost of duplicating data already recorded, rather than hunt through the records for it. The language learner is certainly faced with analogous problems.

[9] A debatable assumption.

The theoretical framework developed in Chomsky and Halle (1968) implies that lexical items can be marked as exceptions to major optional rules. Assuming this to be true, I have argued that during language acquisition such exception markings cannot be entered into the lexicon simply as a consequence of the child's being exposed to adult speech, and that some richer experience is needed, of the kind provided by teaching. But what about the truth of our initial assumption? One would like to tighten linguistic theory so as to exclude the very possibility of lexical exceptions to major optional rules.

To show that one cannot exclude such a possibility would require more than just showing that speakers of some language know, as a result of teaching, that certain lexical items are exceptions to a major optional rule. I will now examine an example where this is the case, and yet this knowledge does not reflect the existence of [− rule R] markings in the lexicon. Rather, it results from the interaction of two systems: orthographic competence, and a grammar acquired on the sole basis of experience acquired through exposure to adult speech.

French has a late rule, call it EPEN, which inserts shwa at the end of a word ending in two consonants or more when the following word begins with a consonant,[10] e.g. *film russe* "Russian film" can be pronounced either [filmrys] or [filmərys], and similarly:

(3) a. *veste sale* [vɛst(ə)sal] "dirty jacket"
b. *carte verte* [kart(ə)vɛrt] "green card"
c. *l'Egypte gagne* [ležipt(ə)gañ] "Egypt wins"
d. *insecte marron* [ẽsɛkt(ə)marõ] "brown insect"
e. *récolte d'orge* [rekɔlt(ə)dɔrž] "barley harvest"
f. *quetsche mure* [kwɛtš(ə)myr] "ripe damson"

(4) a. *test simple* [tɛst(ə)sɛ̃pl] "simple test"
b. *short vert* [šɔrt(ə)vɛr] "green shorts"

[10] This is only a first approximation. For a more precise formulation, cf. Dell (1980).

c. *concept clef* [kɔ̃sɛpt(ə)kle] "key concept"
d. *strict minimum* [strikt(ə)minimɔm] "absolute minimum"
e. *trois volts deux* [trwavɔlt(ə)dø] "3.2 Volts"
f. *match nul* [matš(ə)nyl] "a draw"

I call "colloquial" (henceforth CQ) the range of styles of pronunciation used in everyday conversation, and "orthoepic" (henceforth OP) the style of pronunciation that is prescribed for the reading of prose. In CQ all the words of the form *XCC* without exception can undergo EPEN when in the required environment (cf. 3–4). In OP on the other hand, only those *XCC* words which have the letter *e* in the last syllable of their conventional spelling may be pronounced as [XCCə] in that environment. Hence, in OP, the examples in (3) can be pronounced with or without shwa, but pronouncing the examples in (4) with a shwa is considered incorrect, because it would then sound as though the *XCC* words in these examples were spelled with a final letter *e*. The situation is summarized in (5), with the phrases *un pacte défensif* and *l'impact des balles* "the impact of the bullets" (For reasons of space I transcribe only the medial syllables).

(5)

	pacte défensif		*impact des balles*	
	(i)	(ii)	(iii)	(iv)
a. CQ	paktde	paktəde	paktde	paktəde
b. OP	paktde	paktəde	paktde	*paktəde

The contrast between *pacte*-type words and *impact*-type words is relevant only to the description of OP. Apart from the fact that, in a given phonetic and syntactic environment, shwa tends to occur more frequently in OP than in CQ, the only difference between the two styles that is relevant to our discussion is the contrast between (5-bii) and (5-biv). This contrast is the only kind of data that distinguishes between the *pacte*-type words and the *impact*-type words, i.e., were it not for the data of (5-biv), there would be no phonetic reason for a linguist to distinguish the two classes of words.[11]

Words belonging to certain morphological categories or ending in certain consonant clusters are predictably of the *pacte* type,[12] but there remains a sizeable portion of the lexicon where inclusion of a given item in the *impact* class is an idiosyncratic fact to be learned by rote. Following are quasi-minimal pairs exemplifying this for various clusters.

(6) [rk] *cirque* "circus" vs. *arc* "bow"; [lk] *catafalque* vs. *talc;* [rt] *inerte* vs. *yaourt* "yogurt"; [lt] *adulte* vs. *volt;* [rs] *ours* "bear" vs. *corse* "Corsican"; [lm] *calme* "quiet" vs. *film;* [ks] *sexe* vs. *index;*

[11]But cf. note 13.

[12]Such is the case for all verbal forms, for the feminine forms of adjectives, and for all words with a final obstruent-liquid cluster: *il filme* "he films," *stricte* "strict, fem.", *entre* "between."

[ld] *solde* vs. *Léopold;* [ps] *gypse* "gypsum" vs. *biceps;* [lf] *golfe* "gulf" vs. *golf.*

In order to account for the data of (5), a linguist might be tempted to write a grammar *A* that would contain rule EPEN and where all the items of the *impact* class would be listed in the lexicon as exceptions to EPEN in OP speech. But since the only data which compell the linguist to posit a class of exceptions to EPEN are "negative" data such as (5-biv), data not available to children, the only way for speakers of French to discover the existence of a class of exceptions to EPEN, and its exact extension, is through conventional spelling, which provides them with the necessary "negative" data.[13]

Consider those preschool children who are exposed to a significant amount of data belonging to OP, and whose grammars are presumably devised so as to account for this type of data as well as CQ. All they can acquire, then, on the basis of the primary linguistic data (5ai-iv; 5bi-iii), is a grammar that is identical to *A*, except that it contains no [− rule EPEN] markings in its lexicon. Call that grammar *B*. This is the same grammar as is acquired by those children who are not exposed to any data from OP.

How, then, should one represent the educated adults' competence as reflected in (5)? The prohibition of (5-biv) is merely a particular case of a very general principle implicit in the conventions that tie the orthoepic pronunciation of French to its spelling system. We can express it roughly as follows.

(7) Every segment that appears in the pronunciation of a French sentence must have a counterpart in the written form of that sentence.[14]

[13]For the sake of simplicity of exposition, my label OP includes only the style of pronunciation prescribed for the "correct" reading of prose. There exists besides other non-CQ styles where the *pacte*-type words and words of the *impact*-type contrast. In singing, where shwa is allowed at the end of a line, the line-final *pacte*-type words may be pronounced with or without a final shwa depending on the requirements of the meter, whereas the *impact*-type words should always be pronounced shwaless. This does not change anything in my argument, however, since the materialization of the contrast between the two classes of words in line-final position in singing is again only optional, and my point depends crucially on this optionality.

In classroom recitation of classical verse, all the *e* letters between consonants should be pronounced, regardless of the location of the word boundaries, i.e., the only permissible pronunciations in (5) are (bii) and (biii). Hence data from this style would in principle be a possible source for data permitting the acquisition of the *pacte-impact* contrast. But exposure to the recitation of classical verse plays a negligible role, if any, in the shaping of the pronunciation of pre-school children, for obvious reasons.

[14]A common example of a violation of (7) is the pronunciation [lɔrsəkə] for *lorsque* "when," alongside the "correct" [lɔrskə]. (7) is only a first approximation and should be refined so as to make allowance, for instance for the glottal stops that can appear at the beginning of words that are otherwise vowel-initial, for the yods that are obligatorily inserted between an [i] and a following vowel belonging to the same word (*crier* [krije] "to shout"). But the exact content of (7) is not at issue here. The converse of (7) does not hold, as is well-known. Many letters never have any counterpart in pronunciation.

Whereas (5a) is directly generated by the grammar *B*, which contains rule EPEN with no lexical exceptions, (5b) is accounted for by the interaction of that grammar *B* and the conventions of French spelling, to which (7) belongs. One can use (7) as a filter on the output of *B*. In order to be well-formed in OP, a phonetic representation must be generated by *B*, and must furthermore meet condition (7).

We have here an example of a situation where formal teaching results in a modification of the language learner's overall competence, and yet his grammar *stricto sensu* remains unaffected.

ACKNOWLEDGMENTS

I thank Ken Safir and Dan Sperber for their comments on a first draft of this chapter.

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V COMMENTARY