On Learning "Secret Languages"*

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OO-DAY OO-YAY OH-NAY UHT-WAY IS-THAY EZ-SAY? For many people, the answer to this question is ES-YAY. DUH-GOO YUH-GOO NUH-GO WUH-GUT THUH-GIS SUH-GEZ? For most people, the answer to this question is I HAVEN'T THE FOGGIEST. Both utterances are examples of "secret languages": the first is very common and is known as Pig Latin, while the second is rare and is known as G-language.[1]

Secret languages are known to occur in many of the world's languages. Children often invent them to talk among themselves without comprehension by adults or by other children not in their immediate group. In the Philippines, courting adolescent couples have difficulty achieving physical intimacy, as they are closely watched by their chaperone; hence they use secret languages to gain verbal intimacy (Conklin, 1956). In Surinam, small groups of teenage boys or young men use secret languages to establish peer group solidarity (Price and Price, in press). In some cultures, skill in linguistic play is highly valued and is used more for entertainment's sake than for concealment, as in the "talking backwards" language of the Cuna Indians in Panama (Scherzer, 1970).

Secret languages usually begin with the native language and add a few new rules. In Pig Latin the basic rules are:

1. for each word, delete the first consonant (or consonant cluster)[2]
2. utter the remainder of the word
3. add the deleted consonant, followed by the vowel AY.

Therefore the word SECRET becomes EEKRUT-SAY. In G-language, the rules are:

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[1]The author's father is gratefully acknowledged for inventing G-language; it has yielded interesting data in the secret language experiment as well as some enjoyable family communication.

[2]There are additional rules for items that begin with vowels.

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1. for each syllable, utter the first consonant (or consonant cluster)[2] followed by the vowel UH
2. add G before the next vowel and continue with the rest of the syllable.

Therefore the word SECRET becomes SUH-GEE-KRUH-GUT.

Secret Language Experiments

Recently, we have been devising new secret languages that add rules at various levels of linguistic analysis. We then teach these languages to adults to see the extent to which they can operate on language at different linguistic levels. The following is a recorded passage in one of these new secret languages; see if you can determine what the rules are:

> HERRO. THIS IS A TLANSFOLMED RANGUAGE. HOPEFURRY, YOU WIRR BE ABER TO SPEAK IT. IT'S NOT VELY HALD TO DO, ONCE YOU FIGULE OUT HOW TO DO IT. UNTIR YOU KNOW THE LURES THOUGH, YOU WIRR HAVE TLOUBER UNDELSTANDING IT.[3]

This R-L language was devised for experimental purposes. Its rules are:

1. every time there is an /r/, change it to /l/
2. every time there is an /l/, change it to /r/.

Thus ROCKET becomes LOCKET, LAVISH becomes RAVISH, and CASSEROLE becomes CASSELORE. Note that R-L language involves new rules solely at the phoneme level; there are no changes at the syllable level as in most secret languages.[4]

In a typical word translation experiment, the subject is given a standard English word and asked to translate it into the secret language version. The following tape recorded passage taken from an experiment session illustrates the procedure:

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[3] To facilitate reading, secret language utterances are given in orthographic rather than phonemic notation. Note that this notation does reflect the phonemic form of the secret language transformation rather than being a strict letter replacement system. For example, the phonemic representation of the standard and secret versions of the word TROUBLE are /trʌbəl/ and /tlʌbər/; the notation for the secret language form is TLOUBER rather than TLOUBRE which would be pronounced /tlʌbrə/. When phonemic notation is needed, it is given between slashes.

[4] Phoneme substitutions do occur in some secret languages, for example le bolite spoken in Haiti (Alexis, 1966).

STIMULUS	SUBJECT C.F.
LOCKET	ROCKET
CASSEROLE	CASSELORE
PICKLE	PICKER
MIDDLE FINGER	MIDDER FINGLE
LIVER	RIVEL
LAWYER	ROYAL
NELSON ROCKEFELLER	NERSON LOCKEFERREL

This subject responded quickly and accurately; she had no difficulty making the appropriate substitutions. After the word transformation task was completed, she was asked to produce some connected discourse in secret language form. We asked for a well-known passage in order to decrease task demands; the passage was "Mary had a little lamb." Here is the same subject reciting this nursery rhyme in secret language form:

> MAILY HAD A RITTER RAM, ITS FREECE WAS WHITE AS SNOW. AND EVLIWEL THAT MAILY WENT, THE RAM WAS SHULE TO GO.

Note that all /r/'s and /l/'s were transformed appropriately, and that the whole passage was produced in a highly fluent fashion: pacing and intonation resembled those of ordinary speech.

Now consider another subject working on one item in the word translation task:

EXPERIMENTER	SUBJECT D.Q.
BRAMBLE	BRAIR...BRAIR...RORE
Not quite...BRAMBLE	...BERLAIRM...LULL...LORE
Not quite...	BERLER...BLERM...BULL...BULL
What are the two rules?... R goes to L...	...R to L, and L to R
...BRAMBLE	BLER...BLERM...BUR
That's close. BRAM would be?...	...BLERM
BLAM...You're just transforming R's and L's, okay?	Right. And BRAMBLE, I'm transforming the R to L. So it's BLER... BLER...BLERM. And BULL is...the L to the R...it's BER.
...You're still sticking an R in; you said BLERM. Where do you get BLERM? It was BRAM...	Yah, BRAM. And the R in BRAM goes to L. So it's BL--...BLERM.

BLAM! Just plain BLAM. See, you're still putting an R in next to the M...	BRAM, but you have B-R. And the R goes to L. So I'm trying to delete that R, and make it B-L rather than B-M.
...Rather than B-R.	Rather than B-R, right. So I'm trying to say BLER...BLERM.
Where do you get the R? It's BRAM originally, B-R-A-M...	B-R-A-M. Doesn't that go to B-L-A-M?
Right! How do you pronounce B-L-A-M?	BLAM.
Right. Okay, let's go ahead...	

This subject had great difficulty with the task. Even though he could state the two rules, he was unable to employ them effectively. He worked on this item for almost 3 minutes and never successfully transformed the whole word; finally, the experimenter went on to the next item. I will spare you his NELSON ROCKEFELLER.

These two subjects illustrate the wide range in ability that individuals have in learning the R-L language. The topic of individual differences will be discussed more fully later.

The Present Secret Language Experiment: General Findings

Method. In the present experiment, 63 Yale University students learned R-L language. After hearing a brief recorded passage in secret language form (as given above), they were told the two rules. They then took a word translation test. All 24 stimulus items were acceptable English words, but half yielded words (W) and half nonwords (NW) in their secret language versions. Sample items for the W⟶W[5] case were ROCKET⟶LOCKET and LAWYER⟶ROYAL. Sample items for the W⟶NW case were BRAZIL⟶BLAZIR and LIVER⟶RIVEL. There were 43 target phonemes (/r/ and /l/) in all, since some items contained multiple targets (e.g., BRAZIL). Subjects were instructed to transform only the /r/'s and /l/'s, and to keep all other sounds constant.[6] After completing the word translation task, subjects recited "Mary had a little lamb" in its R-L version. Each subject was tested individually. All responses were tape recorded and later transcribed into phonemic notation.

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[5]The arrow should be read "yields."

[6]Admittedly, there are some obligatory phonetic changes in neighboring units as /r/ and /l/ replace each other. For example, the vowel before the final liquid must be qualitatively different in BRAZIL and its secret language version, BLAZIR. In such cases, the phoneme that was closest to the original but which was still permissible in the new phonetic context was taken as the "correct" form.

Error analysis. There were three major types of errors: 1) failure to transform a target phoneme (e.g., LIVER⟶RIVER rather than RIVEL); 2) phonemic changes in nontarget phonemes (e.g., OFFER⟶OHFUL rather than AWFUL); 3) intrusions (e.g., BRAMBLE⟶BLAMBLER). A composite error score for each subject was obtained by summing the number of all types of errors. The average number of errors was 21 per subject.

Output tempo. Another interesting aspect of the secret language responses was output tempo, which is illustrated in Figure 1. At the top of the display is a diagrammatic representation of a stimulus item. The time line moves from left to right while the hatch marks indicate that audible sound is being produced. While this is a very crude representation of speech, it does serve the present analysis. There were two general kinds of output. 1) Global response: there was only a brief pause following stimulus presentation; then the entire item was uttered in transformed version. 2) Sequential response: there was a fairly long pause after the stimulus item; then the subject gave part of the response, paused, gave some more, sometimes paused again, and finally finished his response. The following taped passages illustrate these two forms of response. First, a subject who characteristically gave global responses:

STIMULUS	SUBJECT T.C.
LEVER	REVEL
BRAMBLE	BLAMBER
LAVISH	RAVISH
MIDDLE FINGER	MIDDER FINGLE

This subject barely paused after the stimulus item, then produced the whole item in secret language form. Next is a subject who characteristically gave sequential responses:

STIMULUS	SUBJECT R.C.
PICKLE	...PICK...KER
LIKELY	...RIKE...RY
BRAMBLE	...BLAM...BER
MIDDLE FINGER	...MIT...TER...FING...GLE

This subject paused for a fairly long time before beginning his response and gave small response units interspersed with additional pauses.

Orthographic influences. Some subjects seemed to stay within the auditory mode: given the sound units of the stimulus, they changed the appropriate units and gave the resulting phoneme string as their response. Others seemed to convert the input phonemes into an orthographic representation before any transformations were made. Figure 2 illustrates the two approaches for the stimulus word LITTLE. The phonemic representation of the stimulus is shown on the left side of the display; the "T" sound is actually a flapped /t/ which sounds like

Figure 1

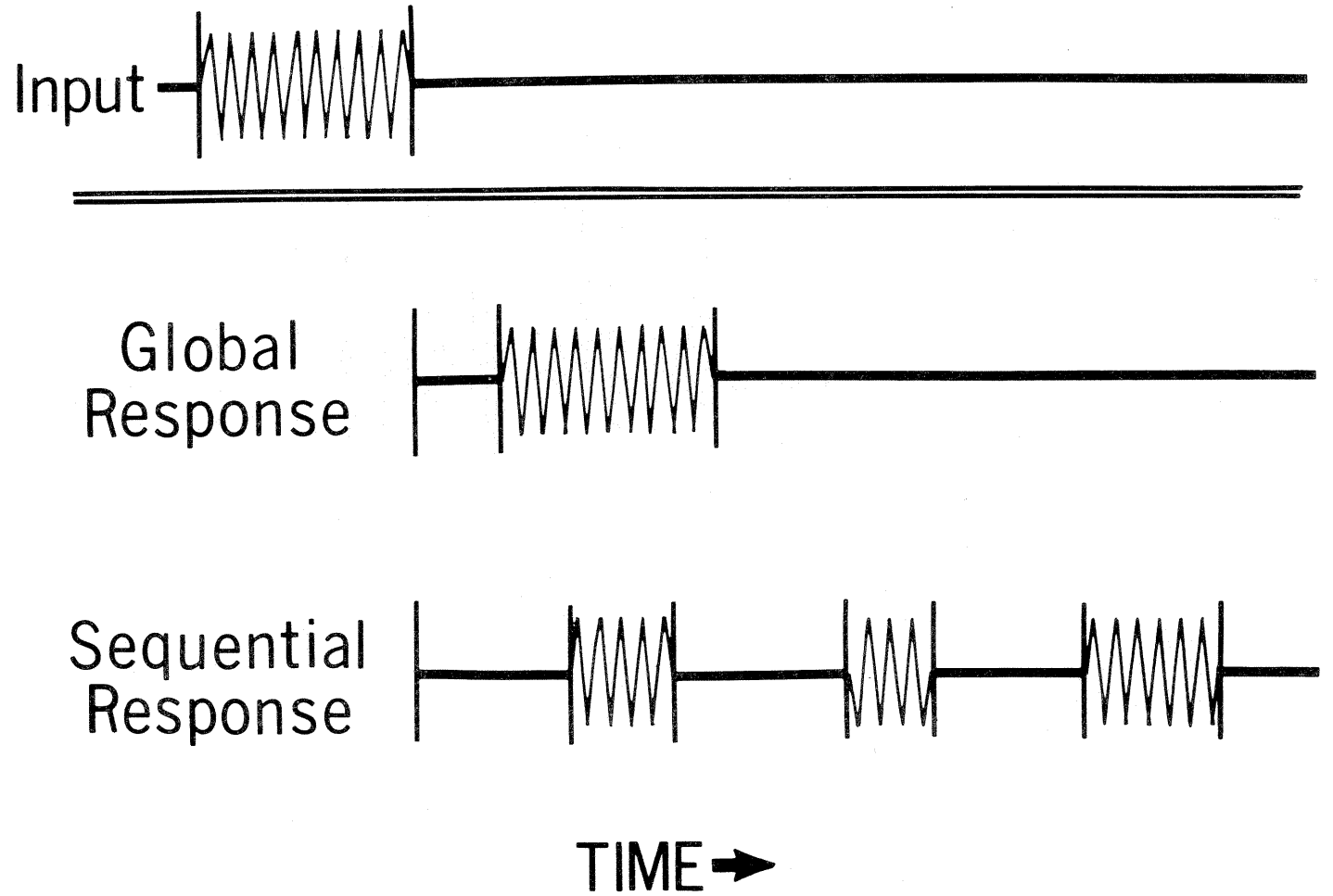

Figure 1: Schematic representation of global vs. sequential output tempos.

Figure 2

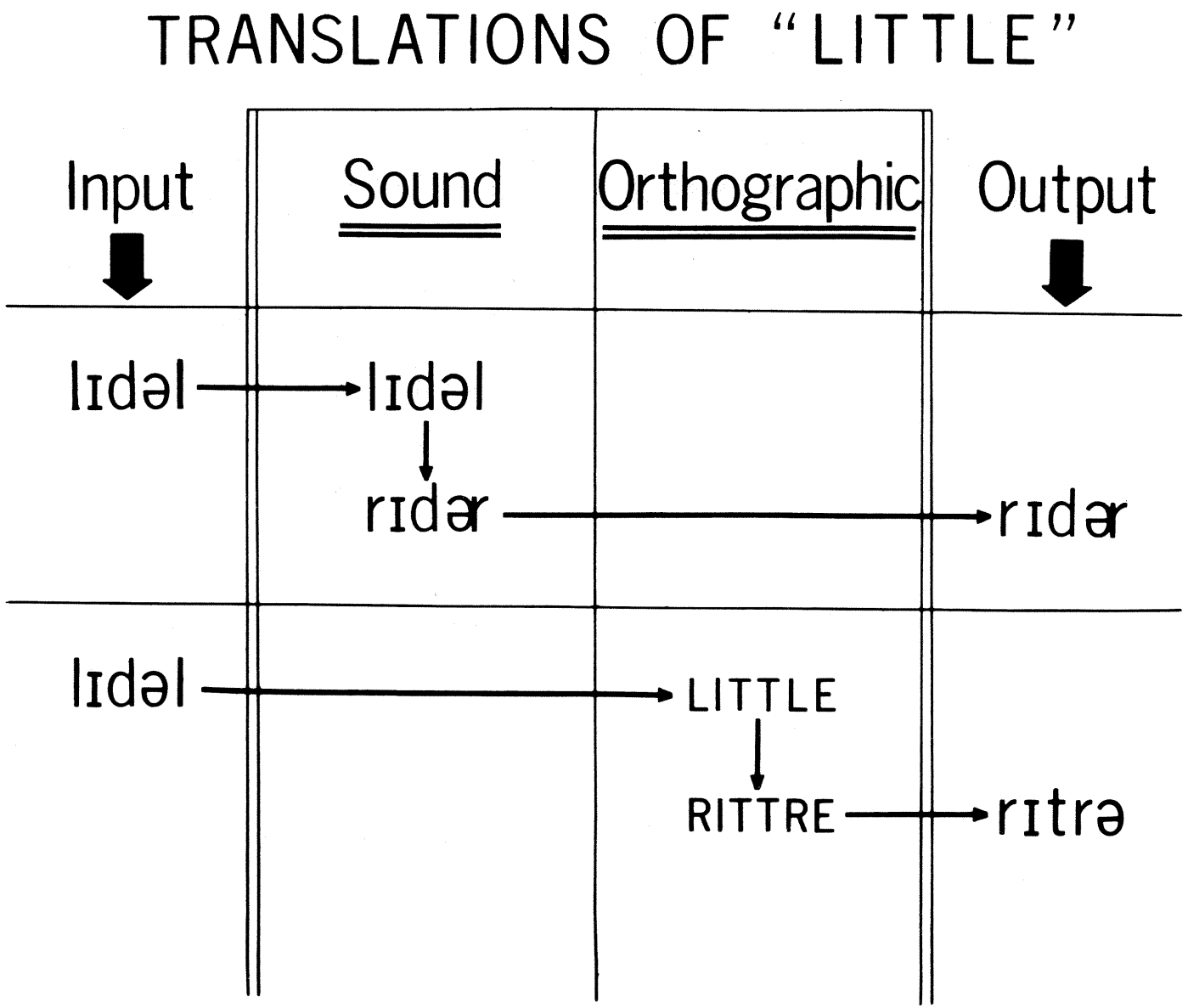

Figure 2: Two translations of a stimulus word: sound only vs. the addition of orthographic influences.

/d/. One way to transform LITTLE into R-L language is RIDDER. This transformation stays entirely within the sound mode: the initial /l/ is transformed to /r/, the final /l/⟶/r/, such that the output is /rIdər/. Other subjects give /rItrə/ as their response. Given the input /lIdəl/, they appear to transform it into an orthographic mode of representation: L-I-T-T-L-E. Transformations are then made on letters; the letter "L" is replaced by "R" in two locations, yielding R-I-T-T-R-E. This new orthographic representation is then turned back into a sound representation, such that the subject says /rItrə/ rather than /rIdər/.

Individual Differences

Earlier we pointed out the wide range of individual differences in success of making /r/⟷/l/ transformations. Were there systematic individual differences in the present experiment? In order to answer this question, a brief discussion of systematic individual differences in another paradigm is necessary.

Studies of dichotic fusion. Large and systematic individual differences have been obtained in the dichotic fusion situation (Day, 1969). Briefly, a different message is presented to each ear at the same time over earphones and subjects are asked to report 'what they heard.' The dichotic items are of the general form BANKET/LANKET. On a substantial proportion of trials, fusions occur: subjects report hearing BLANKET. The extent to which a population of subjects fuses is of primary interest for the present discussion. Each subject is given a fusion score, which is simply the percent of trials on which he gave a fused response such as BLANKET. We then look at the number of subjects who achieved the full range of scores. Ordinarily, in most psychological tests, a normal distribution is obtained, whether the scores represent percent correct, number of trials to criterion, or a variety of other measures. However, dichotic fusion scores are not normally distributed, but are instead bimodal in nature: some subjects fuse most of the time, while others rarely fuse. Since the first bimodal distribution of fusion scores was obtained (Day, 1969), the effect has been replicated many times over several hundred subjects.

Another task, which uses the same dichotic tapes, asks the same subjects to determine which phoneme begins first on every trial. For an item like BANKET/LANKET, the /b/ begins first by a short interval (e.g., 25-150 msec) on half the trials, while the /l/ begins first by the same intervals on the remaining trials. The high fusers report hearing the /b/ first on most of the trials. Note that in English /bl-/ can occur in initial position but /lb-/ cannot. Therefore the high fusers are reflecting the phonological rules of English; they are not reflecting the true stimulus conditions. These subjects have been termed "language-bound" since they are bound by the facts of their language so that they cannot judge the target stimulus events accurately. When the low fusers are asked to judge temporal order they are highly accurate, whether the /b/ or the /l/ began first. These subjects have been termed "stimulus bound" since they are accurate judges of the target stimulus events.

Current secret language experiment. Some of the subjects in the present experiment also took the dichotic fusion tests. Eleven were classified as language-bound and eleven as stimulus-bound. There were clear differences in secret language facility between the two groups. The data given below are for the word translation task; a similar pattern of results was obtained on the translations of "Mary had a little lamb."

The language-bound subjects made almost twice as many errors: their composite error score was 23 errors per person as compared with 13 for the stimulus-bound subjects. Most of the differences between the two groups occurred on W⟶NW items where the composite error scores were 20 and 10, respectively.

Over all items, language-bound subjects gave more global than sequential responses, while stimulus-bound subjects gave an equal number of both types of output tempo. Again, the type of item made a difference. For language-bound subjects, the percent of responses that were global vs. sequential was 80% vs. 20% for W⟶W items and 48% vs. 52% for W⟶NW items. For stimulus-bound subjects, these figures were 60% vs. 40% for W⟶W items and 37% vs. 63% for W⟶NW items. Thus, while both groups of subjects gave more global responses on W⟶W items, it was only the stimulus-bound subjects who gave more sequential responses on W⟶NW items. It might be of interest to teach language-bound subjects to use a sequential strategy on W⟶NW items. While their performance may improve somewhat, they still may do poorly, as illustrated by the attempts described above to get Subject D.Q. to transform BRAMBLE syllable-by-syllable.

Language-bound subjects gave four times as many responses that reflected orthographic influences. They were thus less able to make transformations solely at the sound level, independent of written structure. These are the same subjects who had difficulty in making temporal order judgments in the dichotic fusion situation independent of phonological rules. The stimulus-bound subjects were not misled by orthographic conventions in the secret language experiment, nor were they misled by phonological constraints in dichotic fusion tests.

Discussion. Perhaps Saussure's (1915) notion of la langue (language) and la parole (speech) is helpful in understanding the two groups of subjects. Stimulus-bound subjects are able to track the "speech" end, that is, the actual performance aspects of an utterance. Language-bound subjects, on the other hand, perceive an utterance through "language," that is, through the abstract structure of their language.

The secret language experiment can be used for at least two types of research. 1) "Psychological reality." Secret language rules can be added at various levels of linguistic analysis, for example, the phonetic, phonological, syllabic, syntactic, or semantic levels. The relative ease with which subjects can make these transformations may reflect the extent to which each level or type of rule is psychologically "real." 2) Individual differences. The secret language experiment is well adapted to studying individual differences in language ability. The ease with which individuals can operate on linguistic structure may well have predictive value for foreign language learning.

In conclusion, I introduce you to the secret language experiment as a new tool for studying psycholinguistic phenomena. It also happens to be an enjoyable experience, both for the subject and the experimenter.

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