PSYCHOLOGICAL CORRELATES OF SOME TURKISH MORPHEME STRUCTURE CONDITIONS

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This paper describes an investigation regarding the degree of awareness of a number of different morpheme structure conditions in Turkish displayed by native speakers of that language. It appears that not all the morpheme structure conditions that can be formulated on the basis of the regularities observable in Turkish lexical items are internalized by native speakers; the test results indicate, rather, that with respect to their awareness of certain morpheme structure conditions, native speakers fall into two main groups, neither one of which can be said to know the relevant conditions in precisely their 'correct' form. These results support the view that speakers may well be only very imperfectly aware of regularities that do not fall within the system of fully productive rules of their language.

An important, if thorny, problem in psycholinguistics is that of the psychological reality of linguistic descriptions. Given some particular regularity in a language, how strong is the case for believing that knowledge of it—obviously usually tacit—is a part of the system internalized by speakers of the language? It is occasionally assumed that, if a regularity can be stated, this alone permits us to infer some kind of psychological reality; but there is surely nothing necessary about this assumption. One might equally well assume that someone who learns the sequence of numbers 1, 5, 19, 65, 211, 665 must necessarily know the formula which relates them (namely that the *n*th member of the series equals $3^n - 2^n$). Of course, if a person could not only repeat the sequence correctly, but also continued it on his own with 2059, that would be evidence that he knows the formula in question; but it is just such conclusive evidence that is lacking in the case of certain regularities found in languages. Obviously what is involved here is the question of productivity. It is certainly not always easy, and it may sometimes be impossible, to distinguish between fully productive, partially productive, and unproductive aspects of linguistic structure. Oversimplifying considerably, however, one might view those cases where a regularity involves a productive process as parallel to the continuing of the above series of numbers, i.e. as demonstrating awareness of the rule involved (although we may not be able to tell in exactly what form the rule has been internalized); on the other hand, if we are dealing with a regularity that does not involve a synchronically productive process, then we do not know, without further investigation, whether native speakers have an awareness of the principle underlying the regularity.[1]

[1] In connection with these introductory observations, cf. the following remarks by Wang (1968:706–7): 'When we say, somewhat metaphorically, that a speaker "knows" the phonology of his language, we are in fact using the verb "know" to cover many types of awareness ... Is the degree of his awareness dependent on the formal character of the rule, the complexity of the rule, the number of items in his lexicon for which the rule is relevant, a combination of these factors, or something else still? Though such questions have scarcely been raised, they obviously have a basic importance for phonological theory. Answers to them will help us arrive at a more explicit understanding of what a speaker does and does

What will concern us here is the psychological reality, or lack of it, of some morpheme structure conditions (MSC's) in Turkish.[2] As statements about the internal structure of morphemes we can reasonably regard these as having a different status, with respect to productivity, from phonological rules involving changes of feature values, insertion and deletion of segments, etc. We want to ascertain to what degree native speakers of Turkish are aware of the regularities which these non-productive statements about Turkish phonology express.

Before describing the tests conducted with native speakers of Turkish, some general remarks about Turkish phonology will be necessary. Turkish has eight short vowels, which can be represented as follows in terms of distinctive features:[3]

	i	ü	ı	u	e	ö	a	o
HIGH	+	+	+	+	−	−	−	−
PALATAL	+	+	−	−	+	+	−	−
LABIAL	−	+	−	+	−	+	−	+

Of these vowels, the four high ones /i ü ı u/ and the two non-labial low ones /e a/ participate in the morphophonemic alternations referred to as vowel harmony. With some exceptions which need not concern us here, every suffix vowel agrees with the preceding vowel (short or long) with respect to its value for the feature [palatal], and, if it is [+high], also for the feature [labial]. If it is [−high], it is necessarily [−labial]. Thus the accusative suffix has, after stems ending in non-syllabic segments, the form /i/ if the preceding vowel is [+palatal] and [−labial] (/it/ 'dog', acc. /iti/; /et/ 'meat', acc. /eti/), /ü/ if the preceding vowel is [+palatal] and [+labial] (/gül/ 'rose', acc. /gülü/; /göl/ 'lake', acc. /gölü/), /ı/ if the preceding vowel is [−palatal] and [−labial] (/kız/ 'girl', acc. /kızı/; /kaz/ 'goose', acc. /kazı/), and /u/ if the preceding vowel is [−palatal] and [+labial] (/tuz/ 'salt', acc. /tuzu/; /toz/ 'dust', acc. /tozu/). The dative suffix, which exhibits the [−high] vowel alternation /e/ ~ /a/, has the following forms with the bases just cited: /it/, dat. /ite/; /et/, dat. /ete/; /gül/, dat. /güle/; /göl/, dat. /göle/; /kız/, dat. /kıza/; /kaz/, dat. /kaza/; /tuz/, dat. /tuza/; /toz/, dat. /toza/. The restrictions on vowel co-occurrence within almost all bases of Turkic origin are nearly the same as those just described for suffix vowels; thus for the 'harmonic' part of the lexicon there are two MSC's which replicate, to a great extent, the vowel-harmony rules that determine the selection of vowels in suffixes.[4] There is, however, a large number of loanwords

not know about the phonological structure of his language, and to establish certain constraints on how abstract (i.e. non-phonetic) phonological representations may be.'

[2] For a discussion of the status of MSC's in phonological theory, see Stanley 1967. We need not concern ourselves here with the theoretical issues involved; for our purposes the term is sufficiently self-defining to require no further comment.

[3] The features used here are among those proposed by Wang, whose general framework of vowel features appears to be superior in a number of respects to others that have been suggested at various times. Wang posits [labial] as a feature characteristic of both vowels and consonants, which turns out to be very convenient for the statement of the labial consonant MSC in Turkish (see below), although it raises some still unsolved problems in connection with labialization as a secondary articulation.

[4] It has been customary in generative descriptions of vowel harmony to use the same phonological rules both for filling in redundant feature values within harmonic morphemes

to which these vowel harmony MSC's do not apply—e.g. /günah/ 'sin', /kalem/ 'pen', /sosis/ 'sausage', /viraž/ 'curve'.

The one divergence between base-internal co-occurrence restrictions on vowels and co-occurrence restrictions across morpheme boundaries consists in the fact that a high vowel following an /a/ with an intervening labial consonant (/p b f v m/) will be [+labial], i.e. /u/. Thus we have /a/ followed by /u/ in /karpuz/ 'watermelon', /čabuk/ 'quick', /avuč/ 'palm (of hand)' etc.; but if we add the accusative suffix to, e.g., /av/ 'hunt', what we get is /avı/, not */avu/. There is a fair number of morphemes that conform to this condition: Lees (1966:285–6) lists forty-nine, to which I have been able to add about a dozen more. This list includes both bases of Turkic origin (e.g. /kabuk/ 'rind') and borrowed words (e.g. /sabun/ 'soap'). Many items on the list are everyday words of frequent usage. Exceptions to this MSC, in the sense of bases which conform to the more general labiality harmony condition and thus have the schematic form /... a ... C_{lab} ... ı .../, do exist; Lees (1966:286) gives three, and I have found about ten more, but most of these are quite uncommon words, and I think it is fair to say that the MSC in question expresses a reasonably accurate generalization about words of common use in Turkish.[5]

We thus have three MSC's dealing with vowel co-occurrence, of which two apply to the harmonic portion of the lexicon, while the third applies generally (with the exceptions mentioned, which will simply have to be marked as such). These three MSC's can be stated informally as follows:

(1) Vowels in bases agree in palatality (the PALATALITY MSC).

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and for determining vowel features in affixes (for Turkish see, for example, Lees 1961, 1966). Postal (1968:191–5) has recently argued for such a combined treatment within a phonology that incorporates the notion of markedness. But there is no unanimity on the subject, and Kiparsky 1968 presents a strong case for a differential treatment of base and affix vowels. I now believe Kiparsky's position to be correct (although in Zimmer 1967 I followed the convention of a uniform description for all vowels), but an examination of the various arguments involved can be dispensed with here. I shall, without further discussion, deal with the phenomena of intra-morpheme co-occurrence of vowels in terms of MSC's rather than of phonological rules (which is not to deny that some of these MSC's bear an obvious relationship to certain phonological rules stated elsewhere in the phonology of the language); the general conclusions would in any case apply in equal measure to a model in which comparable intra- and inter-morphemic phenomena of vowel harmony are handled by one and the same phonological rule.

[5] Lees 1966 formulates this MSC as a phonological rule which fills in the appropriate value for labiality (i.e., in his feature framework, [+flat]) for high second vowels in disyllabic bases of the structure we have discussed. This 'Labial Attraction' rule, which precedes the labiality harmony rule, introduces a feature [−FH] (flatness harmony) into the column of features of the labially attracted /u/, thereby preventing it from being unrounded by the labiality harmony rule, while at the same time making it possible for the /u/ to serve as the conditioning environment for the rounding of high suffix vowels. It should be noted that, viewed as a phonological rule, Labial Attraction has the peculiarity of never operating across morpheme boundaries. Although Lees at one point (1966:291–2) explicitly adopts the convention that 'an internal morpheme boundary may be introduced between any two segments without affecting the applicability of [a] rule' (cf. in this connection Chomsky & Halle 1968:364–6), he apparently overlooked the fact that under such an interpretation the Labial Attraction rule will give incorrect results for strings of segments which match its environment, but contain an internal morpheme boundary between the two vowels.

(2) Non-first vowels in bases agree with the preceding vowel in labiality if they are [+high], except if this preceding vowel is an /a/ and a labial consonant intervenes between the two vowels (the LABIALITY MSC).

(3) After /a/, a [+high] vowel agrees in labiality with a preceding [+labial] consonant (the LABIAL CONSONANT MSC).[6]

The studies to be described here were primarily intended to test the degree of awareness which native speakers of Turkish exhibit with regard to the labial consonant MSC, which derives no support from an analogous phonological rule. For the initial experiment (which we shall refer to as Test I), the questionnaire reproduced below was sent to all Turkish students registered at the University of California in Berkeley in the Spring quarter of 1967. A total of twenty-three questionnaires were returned to me.[7]

Following is a list containing pairs of made-up 'words'. For each pair, put a check mark (√) next to that member of the pair which you think sounds more like a word that might actually occur in Turkish (that might, for instance, be a Turkish word that you don't happen to know). Always pronounce the 'words' aloud before checking one. As an example, if one of the pairs were

şmüt
şümüt

you might think that şümüt sounds more like a possible Turkish word, in which case you would mark that 'word', as follows:

şmüt
şümüt √

If both 'words' sound equally possible to you, check both of them. Remember always to pronounce them aloud before making your decision.

temez	tatız
temaz	tatuz
tamuz	tüpiz
tamız	tüpüz
tipaz	tavuz
tipez	tavız
teruz	tamoz
terüz	tamaz
tafız	tokaz
tafuz	tokez
töriz	tabız
törüz	tabuz
teriz	tutaz
terız	tutoz
tapuz	takuz
tapız	takız

[6] Our informal statement of the last two MSC's raises some questions. What would a formal statement of the labiality MSC with its 'except if' clause look like? Also, in view of the obvious relationship between the labiality MSC and the labial consonant MSC, should there be a provision in the theory of MSC's that would allow them to be ordered with respect to one another? Clearly, if we order the two MSC's in question so that the labial consonant MSC precedes the labiality MSC, we obtain just the desired effect, and we can drop the 'except if' clause from the labiality MSC.

[7] All the subjects in this as well as in the second experiment were native speakers of Turkish who had lived in Turkey until they came to the United States to attend college or graduate school. Note that, in the Turkish orthography, ş = [š].

The 'words' in the test are all nonsense words, made up in such a way that they would presumably be interpreted as morphologically simplex forms rather than as base plus suffix. In each pair, one form is always more in accord with the three MSC's discussed above than the other, except that two pairs involve a further MSC which, as it does not strictly have to do with vowel co-occurrence, we have omitted from the above listing. The MSC relevant for the two pairs *tamoz–tamaz* and *tutaz–tutoz* can be stated as follows: non-first vowels in bases are [−labial] if they are [−high] (this MSC, like the palatality and labiality MSC's, is violated by some loan-words, e.g. /balon/ 'balloon'). To return to the vowel co-occurrence MSC's: in the first pair, *temez* conforms to the palatality MSC, while *temaz* does not; in the second, *tamuz* conforms to the labial consonant MSC, while *tamız* does not; in the sixth, *törüz*, but not *töriz*, conforms to the labiality MSC; and so forth. (In the fourth pair, both forms violate the labiality MSC, but *terüz* conforms to the palatality MSC, which is violated by *teruz*.) The total responses for each pair are given in Table 1; 'Expected' designates choices that conformed to the relevant MSC, 'Unexpected', choices that violated it. In the table the 'expected' choice for each pair appears first; e.g., the third pair is listed as *tipez–tipaz*.

PAIR NO.		EXPECTED	UNEXPECTED	NO PREFERENCE
1	temez–temaz	19	3	1
2	tamuz–tamız	3	16	4
3	tipez–tipaz	21	1	1
4	terüz–teruz	20	1	2
5	tafuz–tafız	3	17	3
6	törüz–töriz	19	1	3
7	teriz–terız	23	0	0
8	tapuz–tapız	7	9	7
9	tatız–tatuz	12	6	5
10	tüpüz–tüpiz	22	0	1
11	tavuz–tavız	9	4	10
12	tamaz–tamoz	18	1	4
13	tokaz–tokez	21	1	1
14	tabuz–tabız	5	12	6
15	tutaz–tutoz	20	1	2
16	takız–takuz	15	3	5

TABLE 1

Among the sixteen pairs in Test I, five contain a member that meets the labial consonant MSC (pairs 2, 5, 8, 11, and 14). Two pairs have one member with an /a/ in the first syllable and an /u/ in the second, but no medial labial consonant (pairs 9 and 16). Leaving these seven pairs out of account, the total responses were what might be expected on the basis of the regularities which exist in the harmonic portion of the lexicon; the lowest number of 'expected' responses for any of the remaining nine pairs is 18 (pair 12), the highest number of 'unexpected' responses 3 (pair 1), the highest number of 'no preference' responses 4 (pair 12). The over-all percentages for these nine pairs are: 'expected' responses 88.4%, 'unexpected' responses 4.4%, 'no preference' responses 7.2%. For the five pairs involving the labial consonant MSC, on the other hand, there is a preponderance of 'expected' over 'unexpected' responses for only one pair, namely

pair 11, and even here the 'expected' responses do not constitute a majority (9 out of 23). The relatively high proportion of 'expected' responses for pair 11, i.e. choices of *tavuz*, may be due to the greater than average number of actual lexical items which are very similar to *tavuz* (/tavus/ 'peacock', which differs from it in only one feature of the last segment, /tavuk/ 'hen', /havuz/ 'pool', /yavuz/ 'resolute'). The over-all percentages for the five pairs for which the labial consonant MSC is relevant are: 'expected' responses 23.5%, 'unexpected' responses 50.4%, 'no preference' responses 26.1%. For the two 'decoys', i.e. the pairs where the 'expected' choice would be /a/ followed by /ı/, since there is no medial labial consonant, the percentages are: 'expected' 58.7%, 'unexpected' 19.6%, 'no preference' 21.7%. We shall come back to one other aspect of this test later.

Test II was designed so as to eliminate some of the uncontrolled variables present in the earlier one. For example, the format of Test I gave the subjects as much time as they wanted, and there was no way for me to tell whether a particular response represented a first impression, or was only arrived at after much weighing of the two alternatives. For Test II, I had eighteen pairs of nonsense words recorded twice by a native speaker of Turkish, the presentations being fairly rapid, with intervals of less than one second between the members of a pair and intervals of about four seconds between pairs. The first presentation is that reproduced in Table 2; the second involved the same pairs, but the order in which the members of each pair appeared was reversed (thus, in the second presentation, the first pair was *pemaz* followed by *pemez*, the second *pamız* followed by *pamuz*, etc.) Sixteen subjects (Turkish students at Stanford University and at the University of California, none of whom had participated in Test I) were asked to indicate for each pair which member sounded more like a Turkish word to them; the oral instructions for this test were essentially similar to the

PAIR NO.		EXPECTED	UNEXPECTED
1	pemez–pemaz	30	2
2	pamuz–pamız	17	15
3	tipaz–tipez	24	8
4	teruz–terüz	19	13
5	tafız–tafuz	11	21
6	pöriz–pörüz	32	0
7	balat–blat	28	2
8	teriz–terız	28	3
9	tapuz–tapız	17	15
10	paks–pakas	31	0
11	tatız–tatuz	20	12
12	tüpüz–tüpiz	31	1
13	mavız–mavuz	16	16
14	tamaz–tamoz	26	6
15	tokez–tokaz	26	6
16	tabuz–tabız	16	16
17	putaz–putoz	25	7
18	takuz–takız	22	10

TABLE 2

written instructions for Test I, except that the subjects were asked to indicate a unique preference in all cases. The subjects listened to the first presentation immediately after receiving the instructions; after an interval of about fifteen minutes, during which I talked to them about matters unrelated to the test, they heard the second presentation. The subjects indicated their responses by placing check marks after *a* (for the first member of a pair) or *b* (for the second member) on separate answer sheets for the two presentations. The total number of responses for each pair should be 32; in Table 2 these are broken down into 'expected' and 'unexpected' responses, with the 'expected' choice being underlined for each pair. (For three pairs—7, 8, and 10—the total number of responses is less than 32, since some blanks were left on the answer sheets.)

In Test II there are, in addition to pairs involving choices between vowels, two pairs (7 and 10) where one member has a consonant cluster that normally does not occur in Turkish (/bl-/ and /-ks/).[8] While the great preponderance of 'expected' answers for these two pairs—59 as against 2 'unexpected', with 3 failures to indicate a preference—may in part be a result of the fact that forms of the type *CVCVC* are the norm in the test itself, the rejection of *blat* and *paks* correlates well with the frequent simplification of clusters in loanwords. The purpose of including these two pairs was to get some evidence regarding native speaker awareness of MSC's not involving vowel co-occurrence.

If we divide the remaining sixteen pairs into the same three categories as before (pairs not involving an /a/–/u/ vs. /a/–/ɪ/ choice, /a/–/u/ vs. /a/–/ɪ/ pairs with a medial labial consonant, /a/–/u/ vs. /a/–/ɪ/ pairs with a medial non-labial consonant), we get the following percentages of 'expected' responses:

Group I (pairs 1, 3, 4, 6, 8, 12, 14, 15, 17)	84.0%[9]
Group II (pairs 2, 5, 9, 13, 16)	48.1%
Group III (pairs 11, 18)	65.6%

The range of 'expected' as against 'unexpected' responses for Group I is from 32 and 0 for pair 6, to 19 and 13 for pair 4; for Group II, the range is from 17 and 15 for pairs 2 and 9, to 11 and 21 for pair 5;[10] for Group III, we have 22 and 10 for pair 18, and 20 and 12 for pair 11. The only overlap between groups is due to the relatively low number of 'expected' responses for pair 4 in Group I, a pair where neither member fully conforms to the relevant MSC's. (Notice, however, the discrepancy between Test I and Test II with respect to the proportion of 'expected' responses for this pair: on Test I we have 20 'expected', 1 'unexpected', 2 'no preference', while on Test II we get 19 'expected' and 12 'unexpected'.) The ranking of the three groups in terms of percentage of 'expected' responses is the same on the two tests, namely Group I first, Group III second, and Group II third.

Test II creates the impression that, as far as vowel co-occurrence restrictions

[8] Both these clusters occur in a small number of loanwords (e.g. /blöf/ 'bluff', /boks/ 'boxing'), but they can certainly be regarded as foreign to the over-all phonotactics of Turkish.

[9] The one failure to respond (for pair 8) has been left out of account in this calculation.

[10] Pair 5, it might be worth noting, involves an intervocalic /f/. Of the five labial consonants relevant for the labial consonant MSC, /f/ is by a considerable margin the least frequent one in actual lexical items; I know of only three words where it occurs, none of them being very common.

are concerned, violations of the labiality MSC are the least tolerable (cf. pairs 6 and 12).[11] For violations of the palatality MSC there is a wider range: 30 'expected' to 2 'unexpected' for pair 1, 24 'expected' to 8 'unexpected' for pair 3. But the data hardly permit a significant ranking of these two MSC's for Test II, and Test I does not even produce this impression superficially.

For several reasons (mainly the very small number of responses per informant for the Group III pairs and the 'no preference' responses), no attempt was made to subject the data obtained in Test I to a detailed statistical analysis. An analysis of the data in Test II produced the following results relevant to our investigation:[12]

(1) If we consider those six pairs in Group I which involve agreement in palatality and labiality in the most straightforward way (i.e. leaving out of consideration, because of additional complicating factors, pairs 14 and 17, where one member has an /o/ in the second syllable, and pair 4, in which both members violate at least one MSC), it can be observed that the degree to which the subjects responded in accordance with the relevant MSC's (palatality and labiality) for this group is significantly higher, at the .005 confidence level, than the degree to which the subjects responded in accordance with the relevant MSC's for pairs where one member has an /a/ in the first syllable and an /u/ in the second (Group II, where the labial consonant MSC is relevant, and Group III, where the labiality MSC is relevant).

(2) There is a negative correlation for individual subjects, significant at better than the .05 confidence level, between adherence to the labial consonant MSC for Group II and adherence to the labiality MSC for Group III; in other words, a subject who tends to give 'expected' responses for Group II tends to give 'unexpected' responses for Group III, and vice versa.

The correlation described under (2) is displayed graphically in Table 3. The column on the left gives the possible combinations of 'expected' and 'unexpected' responses for Group II (10–0, i.e. 10 'expected' and 0 'unexpected', to 0–10), while the possible combinations for Group III (4–0 to 0–4) are listed across the top. Subjects are located at the intersection of the appropriate row and column; thus a subject who has only 'unexpected' responses for Group II and only 'expected' responses for Group III will be located at the intersection of the bottom row with the left-most column. A single circle indicates one subject, a double circle two subjects.

In Test I, the number of responses per subject for Group III is too small (namely 2) to permit any very meaningful statement of correlation, but it might be noted that only one of the twenty-three subjects in that test had a majority of 'expected' responses for both Group II and Group III; impressionistically, at least, Test I seems to confirm rather than disconfirm the results of Test II in this respect.

[11] Since /o/ does not occur in non-first syllables in the harmonic portion of the lexicon, pairs 14 and 17 are not involved here.

[12] The statistical analysis of the data was performed by Detlev Lindae, a research assistant in the Department of Statistics at the University of California, Berkeley. I am also indebted to David Reed and George Maverick for assistance in evaluating the data.

		Group III				
		4–0	3–1	2–2	1–3	0–4
Group II	10–0					
	9–1				○	
	8–2				○	
	7–3				◎	○
	6–4	○			○	
	5–5	○	○			
	4–6	◎	○			
	3–7	○				
	2–8		○			
	1–9					
	0–10	◎				

Table 3

Let us now look at the conclusions that can be drawn, with varying degrees of certainty, from the data we have been examining.

First, one might have surmised that, in view of the great number of non-harmonic loanwords in Turkish, speakers of the language would not in fact react to violations of base-internal harmony. This is clearly not the case; the subjects in both tests manifest a considerable preference for nonsense words which conform to the palatality and labiality MSC's (although, as we have seen, this preference is diminished in the case of the labiality MSC when /a/–ı// vs. /a/–/u/ choices are involved). It seems to me that this can readily be explained by the fact that these two MSC's replicate phonological rules which speakers need to know in order to use the language productively—in this case, to make appropriate choices of suffix vowels after any and all bases. I would expect that, if Turkish were to lose suffix harmony, awareness of the palatality and labiality MSC's would diminish greatly. There is, incidentally, no doubt in my mind that the percentage figures for 'expected' choices of suffix vowels after nonsense words would be very close to 100. As a check on this assumption, I orally gave a list of fifteen monosyllabic nonsense words of the shape *CVC* to one subject, asking her to assume that they were nouns and to give me the second person singular possessed form for each one. After stems ending in consonants, the suffix in question takes the form /V_{high}n/, i.e. the suffix vowel agrees in palatality and labiality with the preceding vowel (for example /göl/ 'lake', /gölün/ 'your lake'; /kız/ 'girl', /kızın/ 'your girl'). The subject performed the task required of her, as I had expected, without hesitation and without error. On Test II this subject had shown a strong tendency to choose forms in which /a/ was followed by /u/, regardless of the intervening consonant (thus she chose *tatuz* over *tatız* as well as *tamuz* over *tamız*); but now she invariably chose /ı/ in the suffix when the vowel in the base was /a/. In other words, she over-generalized the labial consonant MSC intra-morphemically, but never extended this over-generalization to cases where a morpheme boundary intervened between the two vowels.

It also seems clear that forms with the vowel sequence /a/–/u/ are not treated in anything like strict accordance with the relevant MSC's as formulated above. Nor, on the other hand, are they treated (except by a few subjects) as entirely on a par with others which do not conform to what we might call 'general labial-

ity harmony', according to which high vowels agree in labiality with the preceding vowel.[13] If the subjects of Test II had generally tended to base their evaluations on the MSC's as we have given them, they should cluster in the upper left quadrant of Table 3; if they had consistently ignored the labial consonant MSC and evaluated the forms they were presented with on the basis of 'general labiality harmony', they should all be in the lower left quadrant, where many, but by no means all, are located. It is hardly possible to propose with much confidence a hypothesis that would account for the behavior actually exhibited, but the following explanation might be worth considering: Let us assume that the subjects located in the left half of Table 3 are operating with two partially conflicting MSC's, namely the labial consonant MSC and an over-generalized version of the labiality MSC, which we have designated above as 'general labiality harmony' (i.e. they drop the 'except if' clause of the labiality MSC). The distribution of subjects we find in this area of Table 3 is then to be attributed to varying degrees of interference of the generalized labiality MSC with the labial consonant MSC. Where this interference amounts to total extinction, as exhibited by the two subjects in the extreme lower left corner, the labial consonant MSC is presumably not present at all as a factor in the task of evaluation performed by the subjects. That it is the labial consonant MSC which is operative here, and not an over-generalized version of it which simply says that /a/ should be followed by /u/, seems to be indicated by the fact that for this group of subjects the percentage of /a/–/u/ choices is considerably higher for pairs where there is a medial labial consonant (33.0%) than for pairs where the medial consonant is /t/ or /k/ (7.5%). For the group in the upper right quadrant, on the other hand, we seem to have varying degrees of interference between the generalized labiality MSC and the over-generalized version of the labial consonant MSC just alluded to (let us call it the /a/–/u/ MSC). (An increase in the dominance of the /a/–/u/ MSC manifests itself only in the pairs with labial consonants; possibly the total number of responses for the non-labial consonant pairs is too small to show differences in this respect.) This provides an explanation for the various facts noted above: For pairs where no /a/–/u/ vs. /a/–/ɪ/ choice is involved, there is no interference with the relevant MSC's, i.e. palatality and labiality, and there is thus a higher percentage of 'expected' responses for these pairs. Since the labiality MSC is interfered with only in the second group of subjects (those in the upper right quadrant), while the labial consonant MSC, as we originally stated it, is interfered with in both groups (increasingly, to the point of extinction, for the lower left group, decreasingly for the upper right group), we can see why the 'decoy' group of pairs, labelled Group III above, should rank higher in terms of its percentage of 'expected' responses than the group of pairs for which the labial consonant MSC is relevant (Group II). And of course the restatement in terms of over-generalized and therefore interfering

[13] It should be added here that subsequent retesting of eight of the original subjects of Test II indicated a very strong preference for /ɪ/–/ɪ/ over /ɪ/–/u/ forms, both for subjects who had previously exhibited an over-all preference for /a/–/ɪ/ over /a/–/u/ sequences and for those who had tended to prefer /a/–/u/ over /a/–/ɪ/. It does not appear likely, therefore, that there is some group which simply prefers [+labial] for high velar vowels in second syllables, regardless of what the labiality value of the vowel in the first syllable might be.

MSC's allows us to account for the negative correlation between 'expected' responses for Group II and 'expected' responses for Group III.

In general, the degree of interference between conflicting MSC's would be measured in terms of the percentage of responses by a given subject where the first rather than the second MSC is applied. Thus, for the subjects in the left half of Table 3, the interference of the generalized labiality MSC with the labial consonant MSC ranges from 40% to 100% (the latter being the limiting case, where the labial consonant MSC ceases to be present at all).[14] It should be added that the foregoing discussion is based on the assumption that the probability of a certain kind of response does not depend on the individual consonant involved (e.g. /f/ vs. /v/), which is probably an oversimplification.

The hypothesis developed above must obviously be regarded as highly tentative. What has been suggested is, in brief, that as far as the phenomena under consideration are concerned, speakers of Turkish can be divided into two main groups, with individual variations within the groups. Clearly this hypothesis needs to be submitted to further testing before it can be considered as established with any degree of firmness. In particular, subjects would have to be retested over extended periods of time to ascertain whether the degree of interference of MSC's for a given subject is reasonably stable; it might conceivably turn out that there is more random variation for individuals than the above explanation assumes. Unfortunately I did not have a sufficiently large number of subjects available to me over a long enough period of time to make such testing feasible. But the correctness of the proposed explanation is of much less consequence than the incorrectness, which the two tests we have described seem to demonstrate fairly convincingly, of any hypothesis that assumes some sort of awareness of the 'correct' MSC's on the part of all speakers. Neither of the two groups into which we can divide the subjects of Test II appears to make exactly the generalizations that we can make as linguists; both groups over-generalize, in what strike me as quite plausible ways. Notice in particular that one can reasonably assume that all speakers operate with the generalized labiality MSC, which exactly replicates the phonological rule for vowel labiality in suffixes, although it conflicts with both the labial consonant and the /a/–/u/ MSC. To the extent that knowledge of the MSC's of a language is assumed to be part of the phonological systems that speakers internalize, our subjects would seem to have somewhat different phonologies, and moreover none of these phonologies are quite 'correct'. The question of course arises as to how speakers of a language can get away with such erroneous notions. This, however, is not really very mysterious. The mistaken generalizations we have attributed to speakers of Turkish do not involve productive phonological rules. Both groups presumably learn lexical

[14] The degree of interference could be captured by a formulation similar to what Labov 1969 calls 'variable rules'. An important difference would be that Labov's variable rules reflect percentages of occurrence that are not subject to significant change from one individual to another within a speech community, but the formulations required in the present case would give percentages characteristic of individual speakers. Furthermore, Labov's rules refer to linguistic behavior that is observable under normal conditions of language use, while the statements of MSC interference would refer to data that could only be elicited under special experimental conditions.

items in their fully specified form and then simply repeat them; the MSC's in question do not fill in values for incompletely specified segments. The speakers who seem to have only the generalized labiality MSC (represented by the two subjects in the extreme lower left corner of Table 3) do not therefore say, for example, /čamır/ instead of /čamur/ 'mud'; what they have apparently done is to leave the forms which conform to the labial consonant MSC out of consideration when they made their generalizations about vowel co-occurrences. Since these generalizations, and those made in this area by other speakers, have no observable consequences in the course of the normal use of the language, they are not subject to correction in the same way in which a wrongly learned productive rule would be. A precise statement of the relevant MSC's, which we might want to incorporate in a phonology of Turkish, apparently does not provide a realistic analog of the knowledge internalized by the native speaker, and of course fails completely to reflect the differences which seem to exist between speakers.[15]

But, it might be objected, all the observations that have been made deal with performance, not with competence. Tests of performance, as has often been pointed out, do not necessarily reveal competence. In this case, however, the appeal to competence is really quite empty, since there is no independent support for ascribing to speakers some competence that is not revealed by their performance. There is nothing which would indicate that they do in fact have correct knowledge of the MSC's in question; the only fact which could conceivably be adduced in support of such a hypothesis is that they pronounce the actually occurring lexical items in Turkish correctly. But this is perfectly explicable in terms of abilities that we know to be present in speakers of other languages, e.g. the ability of speakers of English to remember correctly the vowels in English words, and we therefore do not need to invoke correct knowledge of the relevant restrictions to account for the behavior actually exhibited; this behavior is thus in fact no evidence at all for a competence which is taken to encompass such correct knowledge on the part of native speakers.

It remains to be investigated whether such disparities between the linguist's grammar and the native speaker's grammar, and between the grammars of different native speakers—disparities, it must be kept in mind, which are not reflected in differences in output under normal conditions—can be found in other un-

[15] On the other hand, some experiments by Greenberg and Jenkins involving native speakers' awareness of certain MSC's in English gave essentially the results one might expect on the basis of the regularities exhibited by English lexical items (see Section I, 'Measuring linguistic distance from English', in Greenberg & Jenkins 1964). Of course this does not necessarily mean that speakers of English are equally aware of ALL MSC's that can be stated by a linguist in a phonology of English, or indeed that they are aware of some of them at all. As for our Turkish MSC's, the apparent failure of native speakers to internalize certain ones 'correctly' is presumably, at least in some measure, connected with what might be regarded as the near-conflict between the 'correct' versions of the labiality MSC and the labial consonant MSC. Nothing of this kind was involved in the experiments carried out by Greenberg and Jenkins.—For some other experiments involving 'ungrammatical' phonological forms in Spanish, cf. Contreras & Saporta 1960; the results reported there are somewhat inconclusive, largely, it seems to me, because of certain aspects of the test design.

productive or only marginally productive areas, e.g. in phonological rules that account for forms related by synchronically dead or moribund derivational processes. There is surely no compelling evidence, from what we know of language learning and language use, to exclude the possibility of such disparities, and further exploration of this subject can only serve to make the notion of competence more realistic.[16]

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