

Typological Markedness and Second Language Phonology

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INTRODUCTION

The purpose of this chapter is twofold*. The primary aim is to give an overview of the role of typological markedness in the explanation of facts about second language (L2) phonology. A secondary goal is to explore some of the implications of using such markedness principles to explain facts about L2 phonology. This discussion leads naturally to a consideration of some of the major issues and counter claims surrounding the use of markedness as an explanatory principle in second language acquisition (SLA) in general, and L2 phonology in particular.

The remainder of this chapter is structured as follows. The background section sketches out a brief history of typological markedness, with the following sections discussing the two major hypotheses in SLA that have been formulated around this concept. The treatment of each hypothesis includes a presentation of the kind of evidence that has been adduced in favor of each hypothesis, as well as an evaluation of what the field has gained from the hypothesis and a critical look at what remains to be learned. The discussion then turns to what appears to be a viable future direction for a research program in L2 phonology that incorporates markedness. The final section concludes the chapter.

We begin with a brief discussion of the origin of markedness in linguistic theory and its use in SLA.

BACKGROUND

Markedness

The principle of markedness was pioneered by the Prague School of Linguistics in the theories of Nikolai Trubetzkoy (1939) and Roman Jakobson (1941). The idea behind this

concept was that binary oppositions between certain linguistic representations (e.g. voiced and voiceless obstruents, nasalized and oral vowels, open and closed syllables) were not taken to be simply polar opposites. Rather, one member of the opposition was assumed to be privileged in that it had a wider distribution, both within a given language and across languages. Imposing a markedness value on this opposition was one way of characterizing this special status: the member of the opposition that was more widely distributed than the other was designated as unmarked, indicating that it was, in some definable way, simpler, more basic and more natural than the other member of the opposition, which was in turn defined as the marked member. In the examples cited above, voiceless obstruents, oral vowels and open syllables are all unmarked relative to, respectively, voiced obstruents, nasalized vowels and closed syllables.

As Battistella (1990) points out, there have been over the years a number of different approaches to, and definitions of, markedness (see Moravcsik & Wirth 1986 for some examples), including the presence or absence of overt marking, occurrence in the environment in which neutralization occurs, amount of evidence required for acquisition by child-learners, and the frequency of occurrence across the world's languages. The last notion, distribution among the languages of the world, where there is an implicational relationship between the occurrence of the members of the opposition, is known as typological markedness, and was developed extensively in the work of Greenberg (1976) and can be defined as in (1)¹.

- (1) A structure X is typologically marked relative to another structure, Y, (and Y is typologically unmarked relative to X) if every language that has X also has

Y, but every language that has Y does not necessarily have X. (Gundel et al. 1986:108)

Under this view, typological markedness is an asymmetric, irreflexive and transitive relationship between linguistic representations across the world's languages, such that the presence of one structure in a language implies the presence of another structure, but not vice versa.

Greenberg (1976) noted that, in attempting to formulate universal generalizations about human languages, linguists have often found the most insightful statements to be implicational; that is, the most enlightening universals are formulated in terms of typological markedness. To take a concrete example, not all languages have a contrast in voice, and furthermore, if a language exhibits a voice contrast in some environments, it may not exhibit this contrast in all environments. Nevertheless, it is possible to state a universal generalization about the occurrence of a voice contrast in a language if one states this generalization implicationally, as in (2) below.

(2) If a language has a voice contrast in syllable coda position, it necessarily has this contrast in syllable onset position, but not vice versa.

Thus, a language may not evince a voice contrast in any of its utterances; but if a language does have a voice contrast anywhere, it will have it in syllable onset position. In addition to onset position, a language may also have a voice contrast in coda position; but if a language has a voice contrast in codas, it will necessarily have the contrast in onsets. The claim underlying the idea of markedness, then, is that there is something "basic", "natural" or "common" about a language having a voice contrast in onsets but not in codas, or a language having only oral vowels but no nasalized vowels, or a

language having open syllables, but not closed syllables. It is this type of thinking that is embodied in the idea of typological markedness.

Finally, an important aspect of typological markedness that has made it a particularly useful theoretical tool is that linguists have been able to apply this construct to virtually all kinds of linguistic expressions, including, besides the above phonological examples, lexical, morphological, and syntactic structures, in a number of sub-domains of linguistics. In the next section we focus our attention on the role of markedness in second language phonology, more specifically, we discuss the claim that marked structures are more difficult than the corresponding unmarked structures.

MARKEDNESS IN SECOND LANGUAGE PHONOLOGY

The Markedness Differential Hypothesis

There are two hypotheses relevant to L2 phonology that have been formulated using the construct of typological markedness, the Markedness Differential Hypothesis (MDH) (Eckman 1977), and the Structural Conformity Hypothesis (SCH) (Eckman 1991). We consider each in turn.

The MDH, stated in (3), claimed that typological markedness must be incorporated into the classic Contrastive Analysis Hypothesis (CAH) (Lado 1957, Stockwell & Bowen 1965) as a measure of relative difficulty in SLA.

(3) The Markedness Differential Hypothesis (Eckman 1977: 321)

The areas of difficulty that a language learner will have can be predicted such that

- (a) Those areas of the target language which differ from the native language and are more marked than the native language will be difficult;
- (b) The relative degree of difficulty of the areas of difference of target language which are more marked than the native language will correspond to the relative degree of markedness;
- (c) Those areas of the target language which are different from the native language, but are not more marked than the native language will not be difficult.

Whereas the CAH attempted to explain L2 learning difficulty only on the basis of differences between the NL and TL, the MDH claimed that NL-TL differences were necessary for such an explanation, but they were not sufficient; rather, one needed to incorporate typological markedness into the explanation. The hypothesis asserts that, within the areas of difference between the NL and TL, marked structures are more difficult than the corresponding unmarked structures.

What follows immediately from this hypothesis is that not all NL-TL differences will cause equal difficulty. TL structures that are different from the NL but are not related by markedness principles to any other structures are predicted to cause no difficulty, while TL constructions which are related to other representations by markedness principles are predicted to cause learning problems. The degree of difficulty involved is predicted to correspond directly to the relative degree of markedness.

Evidence for the Markedness Differential Hypothesis

The kind of evidence adduced in support of the MDH involved showing that learner errors could not be accounted for on the basis of NL – TL differences alone, but that typological markedness was necessary to explain the difficulty that learners encountered. One such type of evidenced can be termed “directionality of difficulty”, and results when speakers from two different NL backgrounds attempt to learn the other’s language, and one learner encounters more difficulty than the other. Another type of evidence involves markedness being invoked to explain the different degrees of difficulty associated with learners from different NL backgrounds all acquiring the same TL. The third type of evidence in support of the MDH indicates that markedness can predict the relative degree of difficulty associated with the learning of various TL structures. We will discuss examples of each in turn.

An example of the first type of evidence, directionality of difficulty, was reported in Moulton (1962), in which the author stated that the difference between German and English involving voice contrasts in syllable codas caused more difficulty for German speakers learning English than it did for English speakers learning German. The phonological facts are that English has a voice contrast in obstruents word-initially, -medially and –finally, whereas German exhibits this contrast only word-initially and word-medially. In word-final position in German, this contrast is neutralized in favor of voiceless obstruents. Moulton (1962) stated that, for Germans learning English, acquiring a voice contrast in word-final position was very difficult, whereas for English speakers learning German, the lack of a voice contrast word-finally was not difficult to learn. This example was discussed within the context of the MDH in Eckman (1977), where it was argued that this asymmetry in learning resulted from the German speakers’

having to acquire a relatively more marked structure, a voice contrast in codas, compared to what the English-speaking learners of German had to acquire.

An example of the second kind of evidence, that deriving from different amounts of difficulty associated with learners from diverse NL backgrounds learning a given TL, comes from, among others, Anderson (1987). This study analyzed the learning of onset and coda clusters in English for subjects from three NL backgrounds, Egyptian Arabic, Mandarin Chinese and Amoy Chinese. The markedness principle in question in Anderson's study concerned consonantal sequences in syllable-onset and syllable-coda positions. Specifically, the existence of an onset cluster of length N in a language implies the occurrence of onset clusters of length $N-1$ in that language, where N is an integer. For example, a language that allows three consonants to cluster in onsets will necessarily allow two-consonant cluster, but not vice versa, and a language that allows bi-consonantal onsets will also permit singleton consonants in onsets, but not vice versa. The same principle holds for codas: the presence of a coda cluster of length N in a language implies the occurrence of coda clusters of length $N-1$. In sum, longer clusters in onsets and codas are more marked relative to, respectively, shorter clusters in onsets and codas. The results of Anderson's study supported the MDH in that the performance of the Chinese-speaking subjects was less target-like than that of the Arabic-speaking subjects on coda clusters, and the difference in performance correlated with degree of markedness and with the amount of NL – TL difference.

Additional examples of this kind of support for the MDH were reported in Eckman (1981a; 1981b), in which it was argued that speakers from different NL backgrounds performed differently on voiced obstruents in codas. The determining

factor seemed to be whether or not the subject's NL allowed any obstruents in codas; Japanese and Mandarin do not allow coda obstruents, and consequently subjects from these NL backgrounds were more likely to add a vowel at the end of the TL word, whereas Cantonese and Spanish do allow some obstruents in codas, and subjects from these NL backgrounds devoiced the final consonant in the TL word.

The third kind of evidence, data showing that learners' performance on different TL structures can be explained only by invoking the markedness relationships that exist among the structures in question is exemplified in Carlisle (1991). In this study the author analyzed the production of complex onsets in English by native speakers of Spanish, using a reading task. Because the elicitation involved the subjects' producing an oral text, the number of different environments for inserting an epenthetic vowel to break up a consonant cluster was increased by taking into account the final segments in the preceding word. The findings showed that the subjects modified the complex onsets by inserting an epenthetic vowel, and that the likelihood of a given onset type being modified was a function of the relative degree of markedness of two factors: the cluster in question and the preceding sounds.

Another example of this kind of evidence for the MDH comes from a study by Benson (1988), in which she tested the performance of Vietnamese speakers on a number of onset and coda clusters in English. The data were elicited using a reading task in which the subjects produced single words, and the results were in conformity with the predictions of the MDH. The subjects' performance on the syllable-final clusters was in accord with the hypothesis, though the scores on the syllable-onset clusters exhibited ceiling effects due to the relatively high proficiency of the subjects.

Having discussed some of the evidence in the literature for the MDH, let us now consider some of the methodological issues confronting the claims of the hypothesis.

Issues surrounding the Markedness Differential Hypothesis

The methodological issues that have confronted the MDH in the literature on L2 phonology stem from the fact that the MDH is completely programmatic with the Contrastive Analysis Hypothesis (CAH) in two important respects. First, both the MDH and the CAH make claims about L2 learning difficulty, and second, both hypotheses base their claims about such difficulty, at least in part, on the areas of difference between the NL and TL. We consider each of these issues in turn.

The fundamental prediction of the MDH is that linguistic representations in the TL that are both different and more marked than corresponding structures in the NL will cause learning difficulty. The obvious question then becomes how one measures learning difficulty. Although the vast majority of work in L2 phonology has calibrated difficulty in terms of learner errors: other things being equal, the more errors made on a structure, the more difficult that structure is interpreted to be. However, it has been recognized since the early days of Error Analysis (Schachter 1974) that learner errors are not the only measure of difficulty, and at times may not even be the most reliable measure. One hypothesis that has attempted to address this question is the Similarity Differential Rate Hypothesis (Major and Kim (1996). The central claim of this hypothesis is that rate of acquisition, rather than difficulty, is a more insightful measure of learning than difficulty. As the Similarity Differential Rate Hypothesis is covered extensively by Major (this volume), the reader is referred to the chapter by Major, and nothing more will be said about the SDRH here.

The second methodological issue confronting the MDH concerns the claim that NL – TL differences are crucial to the predictions of the MDH. To be sure, the CAH and the MDH differ in the amount of importance they place on NL – TL differences: for the former, such distinctions are paramount in that they are both necessary and sufficient to predict learning difficulty; for the latter, these differences are necessary but not sufficient. In addition to there being NL – TL differences, the claim is that typological markedness must be incorporated into the hypothesis as a measure of difficulty.

The problem with the predictions of the MDH being based on differences between NL – TL is that some reported error patterns corresponded directly to markedness principles, but the errors did not occur in an area of difference between the NL and TL. In this situation, the spirit of the MDH seemed to be invoked, in that more marked structures caused more errors than the corresponding less marked structures, however, the letter of the MDH prevented the hypothesis from making any predictions. That is to say, as stated, the MDH made predictions only when the marked and unmarked structures in question occurred in an area of difference between the NL and TL. If the structures in question were found in both the NL and TL, then, as stated, the hypothesis made no prediction at all.

This type of pattern with respect to final obstruent devoicing was reported independently by Altenberg & Vago (1983) for Hungarian-speaking learners of English, and by Eckman (1984) for native speakers of Farsi learning English. In both studies it was shown that these L2 learners of English regularly devoiced word-final obstruents, an error pattern which involved a marked position of contrast, but which occurred in an area in which the NL and TL do not differ. English contains many words which exhibit a

voice contrast in word-final obstruents, and both Hungarian and Farsi also have a word-final voice contrast in obstruents. In such cases, the MDH would predict that the L2 learners in question would be able to produce TL voice contrasts successfully by virtue of the similarity of such contrasts in the NL; however, this was not the case. Such data are, therefore, exceptional to the MDH in that it is reasonable for the hypothesis to account for these L2 utterances, but instead the errors lie outside the domain of the hypothesis.

The second type of fact that the MDH could not address was that it gave no prediction as to the kind of strategy the learner would employ when encountering a particular TL difficulty. The hypothesis could not explain why, in other words, L2 learners altered or simplified the marked structures in the way that they did, rather than in some other way. This point will be addressed below in the section on Future Directions.

To summarize this subsection briefly, L2 phonological research bearing on the MDH has concentrated largely on NL – TL differences in allowable coda consonants, and on distinctions in consonant clusters in onsets and codas. The reason for this focus may well lie in the fact that the typological generalizations that have been formulated about onsets and codas are relatively robust. As far as the results from these studies are concerned, none of them has uncovered evidence directly falsifying the claim that learners experience more difficulty with more marked structures than they do with corresponding less marked structures, though it is clear that evidence exists that runs counter to the spirit of the MDH, if not the letter. It is this type of evidence that constituted at least part of the motivation for the formulation of an alternative hypothesis, to which we now turn.

The Structural Conformity Hypothesis

The other hypothesis which invoked typological markedness, or at least the generalizations underlying markedness principles, is the Structural Conformity Hypothesis (SCH) (Eckman 1991), stated as in (4).

(4) The Structural Conformity Hypothesis (Eckman 1991: 24)

The universal generalizations that hold for primary languages hold also for interlanguages.

The primary motivation for the SCH, as argued in Eckman (1996), is an L2 pattern, perhaps, but not necessarily, an error pattern, in which the L2 structures adhere to markedness principles, but the constructions in question are not an area of difference between the NL and TL. Since the pattern does not arise in an area of NL-TL difference, it is not explained by the MDH. One way to address this shortcoming was to eliminate NL-TL differences as a criterion for invoking markedness to explain the L2 learning facts. Essentially, then, the SCH is the result of stripping NL-TL differences from the statement of the MDH. If we can assume that a learner will perform better on less marked structures relative to more marked structures, then the MDH can be seen as a special case of the SCH, namely, the case in which universal generalizations hold for the IL in question, and the structures for which the generalizations hold are ones in which the NL and TL differ,

As stated in (4), the SCH is not formulated within a particular school of thought on language universals, and therefore would be programmatic with any research program invoking linguistic universals. The hypothesis simply asserts that interlanguages and primary languages are similar in at least one important respect: they both obey the same set of universal generalizations².

The strongest kind of evidence that has been adduced in support of the SCH is an interlanguage pattern that is neither NL-like nor TL-like, but nevertheless obeys the kinds of universal patterns found in some of the world's languages. Examples of this kind of evidence have been reported in Eckman (1991), in Carlisle (1997, 1998) and in Eckman & Iverson (1994). Each of these studies considered the case of consonant clusters in onsets or codas, where the TL allowed both a greater number of clusters, as well as more marked clusters, than did the NL.

In Eckman (1991) the data were obtained using several elicitation tasks, including a free-conversation interview, from eleven ESL learners, four speakers each of Japanese and Korean and three speakers of Cantonese. The speakers' performance was analyzed using an 80%-threshold criterion to determine whether a given cluster type was part of a subject's IL grammar. This determination was then used to test the SCH using several universal generalizations about the co-occurrence of consonant cluster types in a language. Out of over five hundred individual tests, the hypothesis was shown to hold in all but five cases.

The studies by Carlisle (1997, 1998) also tested the occurrence of consonant clusters, but in the interlanguage grammars of Spanish-speaking learners of English. The specific hypotheses tested by Carlisle predicted that more marked clusters than more marked clusters would be modified by the learners more frequently than related clusters that were less marked. The results supported the hypotheses in each case. Thus, Carlisle's studies supported the findings of Eckman (1991), but had the additional advantage of showing the operation of the SCH without imposing a criterial threshold on the data.

Eckman and Iverson (1994) analyzed English complex codas as produced in free conversation by native speakers of Japanese, Korean and Cantonese, languages which do not allow complex codas. The findings showed that the learners made more errors on the more marked codas than they did on the less marked ones. As a consequence, the respective IL grammars had the more marked cluster type only if it also exhibited the less marked type.

What is common among studies reporting this kind of evidence in support of the SCH is that in each instance the IL grammars contained cluster types that were more complex than those allowed by the NL, but not as complex as those required by the TL. In this respect, the IL grammars fell between the NL and TL, but always did so in a way that was in conformity with the applicable universal generalizations³.

Having presented the kind of evidence adduced in support of the SCH, we now turn to the major methodological issue that has been raised with respect to this hypothesis, namely, whether it constitutes an explanation for the facts in question.

Issues surrounding the Structural Conformity Hypothesis

Despite the accounts given in the previous section claiming that the SCH has given an explanation for a number of different facts about L2 phonology, it seems that some researchers in SLA have taken the position that markedness, in general, and the SCH, in particular, are not viable explanatory principles. There appear to be at least two arguments given for this position. The first is that markedness itself is simply a fact to be explained, and as such does not offer an explanation. This position is taken by Archibald (1998: 150) and is represented in (5).

(5) “My general assessment of this sort of typological universals approach to second language acquisition is that it provides an interesting *description* of the phenomena to be explained. I’m less sure of their (sic) status as an explanation of the observed facts. All in all, I prefer to assume some sort of structural explanation ...” (emphasis added)

The second counter-claim against invoking typological universals as explanatory principles asserts that invoking such generalizations raises more questions than it answers. This position was taken Gass & Selinker (2001: 154), and is quoted in (6).

(6) “For implicational universals to have any importance in the study of second language acquisition, two factors must be taken into consideration. First, one must understand why a universal is a universal. It is not sufficient to state that second languages obey natural language constraints because that is the way languages are. This only pushes the problem of explanation back one step.”

We consider each of these claims.

The important point that both of these criticisms miss is this: there are *levels* of scientific explanations, where the levels correspond to the generality of the laws invoked. To debate whether a generalization is a description or an explanation is to debate the level of explanation, not whether an explanation has been given. And to reject a hypothesis because it pushes the problem of explanation back one step misses the point that *all* hypotheses push the problem of explanation back one step--indeed, such “pushing back” is necessary if we are to proceed to higher level explanations.

To address these claims, let us take a brief look at the nature of scientific explanation. Our goal will be to show that the accounts offered by markedness principles and the SCH for facts about L2 phonology do in fact constitute explanations⁴.

Scientists explain facts about the world by subsuming them under general laws. The fact to be explained is shown to be a specific instance of a more general phenomenon (Hempel & Oppenheim, 1948). To take a concrete example, how do scientists explain that a rod or stick looks bent when it is partially submerged in a container of water? Or if we consider a linguistics example, how do phonologists explain the fact that [t] alternates with [s] in the Finnish words in (7a & b) whereas the [t] in (7c) and (7d) does not?

- | | | | |
|-----|----|----------------|---------|
| (7) | a. | [haluta] | to want |
| | b. | [halusi] | wanted |
| | c. | [tila] *[sila] | room |
| | d. | [aiti] *[aisi] | mother |

In the first example, scientists make reference to the laws regarding the velocity of light through different media, noting that light travels faster through air than it does through water, thus causing the partially submerged stick to appear bent. The appearance of the partially-submerged stick, therefore, is shown to be a particular case of a more general phenomenon, namely, the fact that light travels at different velocities in different media.

The explanation for the for the alternation in (7a & b) follows the same general pattern, except that it uses laws that refer to sound segments and phonological environments. Specifically, phonologists explain the alternations in question by appealing to a universal principle known as the Derived Environment Constraint (DEC) (Kiparsky (1982). The representations in (7a & b) motivate a rule (or some other

construct) for Finnish that will account for the fact that [t] alternates with [s] before the vowel [i]. The DEC restricts this principle (and other similar rules or constructs) to apply only in what is called a derived environment, one in which a morpheme boundary separates the relevant segments, in this case, the [t] or [s] and the [i]. Thus, the alternation is licensed in (7a & b), but not in (7c) or (7d).

The same kind of explanation was given to explain why, for example, the L2 learners studied in Eckman (1991), cited above, evinced patterns of consonant clusters in onset and coda positions, where these clusters were not TL-like, nor were they licensed in the learners' NL. The SCH was invoked as a covering law in this case, claiming that the observed interlanguage patterns that adhered to markedness generalizations about consonant clusters were a particular instance of a more general phenomenon, namely, interlanguage grammars obeying universal generalizations.

The facts in the above examples are explained, then, by showing that they occurred in accordance with general laws. Now, there is an important point that was first raised by Hempel & Oppenheim (1948), and that bears crucially on the above statements in (5) and (6) by Archibald and by Gass and Selinker: the question of "why" can also be raised with respect to the general laws that are invoked as explanations. These laws, in other words, can come to be regarded as facts to be explained, and would be explained if one could subsume them under generalizations which are more comprehensive; that is to say, they would be explained if it were possible to deduce them from some more-encompassing laws or principles.

Given this background, it is important to recognize the following point: any proposed explanation of some phenomenon always engenders additional questions,

because the generalizations serving as explanatory principles can also become the target of explanation. Thus, it is always the case that any explanation is adequate only to the extent of the current state of knowledge and understanding of the phenomenon under investigation.

It follows from this that there are levels of explanation, where “level” can be defined as the relative generality of the principles used in the explanation (Sanders 1974). In the context of the examples presented so far, any generalization from which it would be possible to derive the velocity of light in different media, or from which we could deduce the Derived Environment Constraint, or which would subsume the SCH, would constitute a higher-level explanation for those generalizations. It follows further that all empirical generalizations and hypotheses are, at the same time, a means for explaining lower-level generalizations, and the object of explanation for higher-level generalizations (Sanders 1974).

Some linguists may refer to the Derived Environment Constraint, the SCH and principles of markedness as descriptions of the facts rather than as an explanation. And based on the above discussion, these linguists would be partly correct and partly incorrect. They would be right in saying that these principles constitute a description of the facts in the sense that lower-level generalizations become facts for higher-level generalizations to explain. But these linguists would be incorrect in asserting that these principles are not explanations, because they are law-like statements which make testable predictions. Thus, a linguist can propose a generalization from which the DEC follows, or is able to formulate higher-order principles from which markedness generalizations are derivable, is justified in referring to the DEC or to markedness principles as facts, and not

as explanations. However, it is sound scientific reasoning to reject the DEC and markedness generalizations as explanations *only* if one can then propose higher-level generalizations under which these principles can be subsumed. In the absence of more general principles, it is scientifically imprudent to reject the DEC and markedness generalizations as merely descriptions, because in so doing one would be left with no explanation at all.

This discussion now sets the context in which to reconsider the claims in (5) and (6) above (repeated below as (8) and (9), respectively) about whether hypotheses that invoke markedness principles, such as the MDH and the SCH, are viable explanations.

(8) “My general assessment of this sort of typological universals approach to second language acquisition is that it provides an interesting *description* of the phenomena to be explained. I’m less sure of [its] status as an explanation of the observed facts. All in all, I prefer to assume some sort of structural explanation ...” (Archibald 1998: 150, emphasis added)

What Archibald has clearly missed here is that typological universals are laws that subsume phenomena under a generalization, make predictions, and thus constitute an explanation. As we pointed out above, markedness principles, as is the case with all generalizations, can themselves be the target of explanation. To the extent that one can invoke a higher-order generalization under which to subsume the principle in question, it is possible to refer to the generalization as a fact; if one cannot offer a more-encompassing principle, then it is imprudent to refer the law as a fact instead of an explanation.

(9) “For implicational universals to have any importance in the study of second language acquisition, two factors must be taken into consideration. First, one must understand why a universal is a universal. It is not sufficient to state that second languages obey natural language constraints because that is the way languages are. This only pushes the problem of explanation back one step.” (Gass & Selinker 2001: 154)

A similar point can be made with respect to the claim in (10). If one does not accept a universal generalization as an explanation for L2 facts because such a generalization “pushes the problem of explanation back one step”, one would never be able to accept **any** generalization as an explanation, because **all** generalizations, **all** hypotheses push the question back another step by raising further questions. Indeed, such questioning is necessary if our level of understanding is to deepen.

To summarize this subsection, the Structural Conformity Hypothesis addresses the shortcomings of the Markedness Differential Hypothesis, first, by making predictions about the nature of interlanguage grammars rather than on learning difficulty, and second, by expanding the domain of the hypothesis beyond only areas of difference between the NL and TL. The SCH asserts simply that ILs will obey the same universal generalizations as primary languages. The thrust of the explanation is that interlanguages are the way they because they are specific instances of a more general phenomenon, namely, human languages. Finally, although the universal generalizations and markedness relations, which serve as explanatory principles under the SCH, may themselves be the target of explanation, this does not vitiate their standing as explanatory

principles, because all scientific laws are, at the same time, explanations as well as facts to be explained⁵.

Given this discussion of the SCH within the broader context of what constitutes an explanation, the question naturally arises as to whether there is an important fact about L2 phonology that the SCH cannot account for, but that can be explained within an alternative framework. And here we reprise once again the case of word-final devoicing reported in the studies by Altenberg and Vago (1983) and Eckman (1984). What is particularly intriguing about this case where L2 learners evince a pattern that is not found in the NL, nor is it derivable from TL input, but is nevertheless attested in the grammars of numerous languages of the world. The obvious question is what the source for such regularities is. The SCH provides no explanation, as it simply allows whatever kinds of universal constraints and principles are found to govern primary languages to hold also for interlanguages. We conclude this chapter with a consideration of some future directions, and the suggestion that the framework of Optimality Theory may well have a natural source for such IL patterns.

FUTURE DIRECTIONS

Having argued in the preceding sections that universal, typological generalizations and markedness relations can be used in the explanation of various facts about L2 phonology, we now face the question of whether markedness principles can be naturally incorporated into a theory of language, a question which has arisen from time to time over the years within the SLA literature (Flynn 1987, White 1987). Until recently, phonological theories have had difficulty incorporating markedness principles and generalizations in any natural way. Although there seems to have been recognition over the decades that

markedness generalizations are an important component of phonological theory, markedness principles appear to have been little more than appendages tacked on to the theory, almost as an after-thought. In fact, in one of the major phonological works in the last few decades, the *Sound Pattern of English*, markedness is treated in the very last chapter of the book, under the heading of *Epilogue and Prologue*.

To date, the only phonological theory, with the possible exception of Natural Phonology (Stampe 1979), to explicitly and intrinsically incorporate markedness is Optimality Theory (Prince & Smolensky 1993). Because Optimality Theory (OT) is discussed in detail by Hancin-Bhatt (this volume), its treatment here will necessarily be brief. There are, however, three important features of OT that are worth pointing out within the context of this chapter, viz., that OT grammars all consist of a universal set of constraints, that grammars of particular languages result from different rankings of these universal constraints, and that the constraints are divided into two subgroups, markedness constraints and faithfulness constraints. We consider each of these in turn.

First, a way to view the universal constraints is as a set of criteria for well-formedness. From the stipulation that all constraints are universal, and that grammars differ only in the particular ranking of the universal constraints, the theory makes the claim that well-formedness criteria do not differ from language to language; rather, what varies across languages is how these criteria are applied, that is, how they are ranked. OT is thus inherently a theory of typology: any ranking of the universal constraints should yield a grammar of a language, and any grammar of a language should conform to one of the possible rankings of the constraints.

Second, given that the goal of a grammar is to specify all and only the well-formed utterances in the language, or in the case of phonologies, all the well-formed pronunciations, OT grammars and rule-based grammars accomplish this aim differently. Rule-based grammars begin with the lexical representation of an utterance and execute a derivation, applying the appropriate rules to the lexical representation, making the changes specified by the rules, producing intermediate representations to which other rules are applied, and continuing until all of the applicable rules have been brought to bear, and the output is specified. The well-formed utterances of the language are predicted to be all and only those which can be successfully derived using the rules of the grammar. An ill-formed, or ungrammatical, utterance is characterized by showing that its derivation violates one or more of the rules of the grammar. On the other hand, the constraints of an OT grammar are violable; no single utterance can satisfy all of the universal set of criteria for well-formedness. Within OT, therefore, grammaticality is not characterized on the basis of whether or not an utterance violates one or more of the constraints; instead, the grammaticality of an utterance is determined by an optimization procedure whereby well-formed utterances are those that conform to the highest ranked constraints in the grammar.

This leads to the third important feature of OT within the context of this chapter, that the set of universal constraints is divided into two categories, faithfulness constraints and markedness constraints. Interestingly, this division has been cited as corresponding, roughly and respectively, to the notions contrast and articulatory ease (Gundel et al. 1986). The important point, from our perspective, is that, within OT, markedness is incorporated as a basic tenet of the theory.

Incorporating markedness into the general theory through the ranking of the universal set of constraints provides a natural explanation for the kind of L2 phenomenon that has previously eluded explanation, namely, an IL pattern, attributable to neither the NL nor TL, but one that is nonetheless attested in the grammars of at least some of the world's languages. Within an OT framework, this situation follows naturally from the tenet that the set of constraints is universal, and therefore is present in the grammars of all languages. In the case under consideration, the fact that neither the NL nor the TL evidences word-final devoicing is because the constraints that characterize such devoicing within OT grammars, though present in the grammars of both the NL and TL, are ranked low in these grammars. Consequently, the word-final devoicing constraints are not determinant in characterizing the utterances of either the NL or TL.

Now, if we assume that interlanguage grammars are also characterized by a ranking of these universal constraints, then a clear source for the observed word-final devoicing pattern emerges. If the constraints in the IL grammar are ranked differently than those in the NL or TL, then the possibility exists that the constraints that characterize devoicing could become determinant, producing the observed pattern.

Two interesting consequences follow from this view of interlanguage grammars within an OT framework. First, we should expect the error patterns observed in L2 utterances to be attested as structures in the grammars of at least some other languages. This is true because IL grammars consist of the same constraints, though perhaps different rankings of those constraints, as other languages. And second, interlanguage grammars are predicted to differ from primary language grammars in the same way that primary language grammars differ from each other. This follows because IL grammars

are characterized using the same constructs, viz., constraints and constraint rankings, as are used in primary language grammars.

CONCLUSION

This chapter has attempted to argue the following points: that typological markedness has played a significant role in the explanation of facts about L2 phonology; that markedness generalizations are explanatory principles in the sense of being covering laws under which phenomena can be subsumed; that markedness will continue to play a significant role in L2 phonology within the framework of Optimality Theory.

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¹ Other definitions of markedness have been used in the literature on L2 phonology, including the conceptualization of markedness in terms of parametric variation within Universal Grammar. This work includes studies such as Broselow and Finer (1991) and Archibald (1998). See the chapter by Archibald (this volume) for discussion.

² As stated, the SCH is neutral as to whether those universal generalizations fall within the context of Universal Grammar (UG), or are stated as typological generalizations. As a matter of practice, however, the SCH has been tested and invoked as an explanatory principle only within the context of typological universals.

³ This same point is made in the study by Broselow and Finer (1991), but within the framework of parametric variation as allowed by UG.

⁴ A more detailed account of explanation in SLA is given in Eckman (2004).

⁵ It is certainly true that the Hempel-Oppenheim model of explanation assumed for this discussion is not without its problems. However, space limitations prevent pursuing this point further here. For a fuller discussion of this topic, see Eckman (2004).