ers, and students, that pronunciation of a second language is simply not very important. This conviction is more difficult to fight, but I think the evidence will show that it too is incorrect. It is essential not only that second language learners should acquire the grammar system and vocabulary, but also that they should be intelligible to other speakers of that language; it is clearly possible for a learner to master the syntax of a language but not the phonology. Further, it is my belief that research in this area will shed much light on our understanding of the process of speech perception in general.

Whatever the reasons, however, the studies on interlanguage phonology have been sparse. This chapter will examine the nature of the data and the major issues involved in current research on interlanguage phonology. The two central issues seem to be:

1. the nature of the processes which shape interlanguage phonology;
2. the phenomenon of fossilization of interlanguage phonology.

THE PROCESSES SHAPING INTERLANGUAGE PHONOLOGY

In the 1960s, there were quite a few papers written which claimed to be able to predict errors in the pronunciation of second language learners on the basis of a contrastive analysis of the phonologies of the native language (NL) and target language (TL). All learner errors in pronunciation were felt to originate from negative transfer—that is, the learner's attempt to use inappropriate sound patterns of the NL in place of the sound patterns of the TL. A very simplistic contrastive analysis of the NL and the TL might reveal the patterns in Table 4.1:

In example (1) we have a case of positive transfer: both the native language and the target language have the phoneme /t/, so we would expect that the learner will have no difficulty with this sound in the target language. In example (2) we have an example of negative transfer which we might call convergence: where there are two phonemes /t/ and /\ in the native language, these two sounds are considered variants in the target language of a single phoneme /t/.

We would predict few if any problems for the learner in this case, either, since

<table>
<thead>
<tr>
<th></th>
<th>Native language</th>
<th>Target language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>/t/</td>
<td>/t/</td>
</tr>
<tr>
<td>2</td>
<td>/t/</td>
<td>/\</td>
</tr>
<tr>
<td>3</td>
<td>/t/</td>
<td>/t/</td>
</tr>
</tbody>
</table>
the learner does not have to learn to make or hear any new distinctions in the TL. It is example (3), a case of divergent negative transfer, which would predict the most difficulty for the learner; where his native language has only one phoneme /l/, the target language has two, /l/ and /r/. These two are likely to be perceived and uttered by the learner as minor variants of the NL phoneme /l/, and the learner would be predicted to have much difficulty in discriminating between them.

It is important to note that few of the early papers on contrastive analysis made any attempt to go beyond anecdotal examples in support of their claim that all learner errors in pronunciation could be predicted in this way. The concept seemed to make sense intuitively, and so it was never rigorously tested experimentally.

Those experiments which were run to measure empirically the degree of negative NL transfer effects in the learners’ pronunciation of TL sounds were run in more or less artificial experimental situations, presenting TL words and sounds in isolation and examining the learners’ ability to perceive or produce the sounds being studied. I will not attempt to summarize all of the early experimental studies here; for a complete summary of these studies see Johansson (1973).

Brière (1966) reports on one of the most thorough of these early experiments. Words containing 14 non-English sounds (from Arabic, French, and Vietnamese languages) were presented on tape as targets for 20 American students. The students repeated the words as they heard them, and their responses were recorded and transcribed. Based on the mean number of correct responses by the subjects, a hierarchy of difficult sounds was established. It is interesting to note that while most of the results of Brière’s investigation were predicted by his contrastive analysis, some were not. For example, when /ɡ/ (a voiced uvular fricative) was the target, subjects substituted several American English sounds as predicted—but they also substituted /r/ (a uvular trill), a sound which does not occur in American English. Generally, Brière found that NL and TL sounds which were similar were easy for learners to pronounce; the major exception to this finding was /ʃ/, which, while very different from any American-English (AE) sound, was still easy for the subjects to learn. Also the non-AE sound /t/ (a voiceless nonaspirated fortis dental stop) was significantly easier to learn than the dentalized /t̪/, very close to AE. Finally, in his contrastive analysis, Brière found it necessary to use the syllable as the prime unit of analysis, showing that the American-English rules for distribution of /ʃ/ within the syllable affected the students’ ability to learn the sound in other syllable positions. Hence, any contrastive analysis had to take the syllable structures of the two languages into account. Thus, Brière’s results showed in 1966 that contrastive analysis, as it was commonly being used to predict pronunciation problems for second language learners, was not completely successful in its predictions of learner performance on an experimental task.

Other experimental studies using isolated words and syllables examined the perception of speech sounds by speakers of several languages. Carroll and Sapon (1957–1958), Lotz (1960), and Scholes (1968) had results indicating that negative transfer from the NL was influencing subjects’ performance on experimental perception tasks, while Stevens (1969) and Singh and Black (1966) concluded that the subjects’ perception of some TL features operated independently of their first language background.

So, even though contrastive analysis was claimed to be able to predict all learner errors in pronunciation, experimental evidence from the 1960s showed that processes other than negative transfer were also at work.

It is important to reiterate that these studies did not look at spontaneous interlanguage (IL) performance—that is, they did not examine the IL speech of second language learners engaged in communication. Indeed, Brière’s was the only study which looked primarily at pronunciation rather than perception. All these studies artificially isolated TL words and sounds, and examined the perception and repetition skills of subjects in a fairly limited environment.

The limitations inherent in such a reductionist experimental approach are highlighted in a paper by Nemser (1971). Nemser ran an experiment using Hungarian subjects learning English, and showed that the nature and number of the sound substitutions made by subjects in his study depended on the experimental task used (e.g., transcription of sounds in nonsense syllables, translation from NL to TL, etc.). That is, the method used to gather data on interlanguage phonology influenced the nature of the data gathered. Nemser’s results have serious implications for second language acquisition researchers interested in studying phonology. As we shall see later, interlanguage phonology happens to be variable, that is, highly sensitive to shifts in communication situation, speaker mood, etc. Researchers in this area should be aware of this fact. It is this writer’s opinion that if researchers’ results are to be at all applicable to L2 learner speech and speech perception in the classroom and in the real world, an attempt should be made to gather spontaneous speech data. Certainly researchers should avoid the testing of isolated speech segments in artificial settings.

The earliest study of which I am aware which gathers data at the sentence level is that of Johansson (1973). Johansson reports on a very extensive study which analyzes the segmental interlanguage phonologies of 180 native speakers of nine different languages, who were asked to repeat Swedish (TL) words and sentences which they heard on tape. Johansson’s subjects were not engaged in spontaneous communication when her data were collected, and hence, as she herself notes, “it is possible that our results would be different in a different testing situation.” She justifies her method of data collection, however, by noting that the repetition of sentences involves the skills of both speech perception and production, and by pointing to first language acquisition studies indicating that sentence repetition tasks elicit better performance in pronunciation than spontaneous speech elicited by the description of pictures (p. 48). A similar position has been taken by researchers using elicited imitation tasks in second language
acquisition research. Certainly, the fact that the TL materials were presented at the sentence level is a vast improvement over all the previous experimental studies, and Johansson’s careful detailed analysis of the results of her multiple contact study produce a significant contribution to our understanding of second language learner phonology.

Johansson’s subjects were 20 native speakers each of nine different languages: American English (AE), Czech, Danish, Finnish, Greek, Hungarian, Polish, Portuguese, and Serbo-Croatian. The subjects’ repetitions of Swedish words and sentences were recorded and transcribed; deviations from the Swedish model were recorded in narrow phonetic transcription. The quality and quantity of each of these segmental deviations from the Swedish model were recorded and the results are presented in great detail by language group. After an extensive review of the literature on contrastive analysis and error analysis, with particular reference to phonology, Johansson analyzes her data to determine the extent to which errors seemed to be caused by negative NL transfer and hence were predictable by contrastive analysis. She concludes that “a large number of the substitutions made could have been predicted by contrastive analysis”; however, she also concludes that there were some general common directions for substitution followed by all language groups. There was a general “tendency [in substituting for TL sounds] to move from the extreme higher and lower positions in the articulation area toward the middle height, the tongue’s rest position.” Further, there were some very real limitations to the power of contrastive analysis to predict the shape of interlanguage phonology:

There is definite evidence for the claim that learners confronted with a new language use not only sounds which occur in L1 and L2 but also other sounds which could not be directly predicted by contrastive analysis.

For example, she found that her subjects seemed to be trying to modify certain sounds away from L1 and toward L2, as when her American-English and German subjects produced [a] for the Swedish [au]. She found examples of overgeneralization, with learners who used “one Swedish sound for another where neither has a counterpart in the speaker’s L1”; an example of this type of overgeneralization occurred when native speakers of Czech and Polish used [y] for the Swedish [au]. Finally, Johansson notes that contrastive analysis provides no way of determining where differences between languages will not lead to difficulty or where seemingly similar differences lead to various degrees of difficulty.

For example, contrastive analysis could not predict that higher vowels and some long and back vowels would be more difficult for all groups.

Johansson’s study is a valuable contribution to our understanding of the relative effect of transfer on segmental interlanguage phonologies. Her data seem to indicate that language transfer does operate to shape certain aspects of the IL phonology, but that other processes, such as overgeneralization and approxi-

mation, also operate. In addition, her study repeats Briere’s finding that it is not enough to predict that differences between two phonological systems will automatically create learning problems in exact proportion to the degree of difference between them. In some cases, NL and TL sounds which seemed to be very similar were very hard to learn, and in others, NL and TL sounds which seemed to be very different presented no learning problem. Johansson’s data suggest that one of the constraints involved in shaping the relative difficulty of the learning of new L2 sounds may have to do with the intrinsic difficulty of those L2 sounds, an effect operating independent of the process of negative transfer, but interacting with it. That is, given that higher vowels in Swedish were usually more difficult for all groups, was there an interaction effect such that those learners whose L1s had similar vowels found the Swedish vowels somewhat less difficult than those learners whose NLs had no such similar sounds? It seems to me that a theory of interlanguage phonology would have to take into account any such interaction effects of the several processes which seem to be identified as operating to shape IL phonology.

Wode and Felix have reported recently on the findings of an extensive first and second language acquisition project in Kiel, Germany, which is investigating German L1 children learning English L2 and English L1 children learning German L2. This is a longitudinal study collecting data in real communication situations and analyzing its syntactic, morphological, and phonological characteristics. The Kiel findings on the IL phonologies of children seem to be quite consistent with those of Johansson for adults. Wode (1976) finds evidence that some phonological elements are strongly affected by negative transfer from the NL, while other elements seem to be acquired with no influence from the NL, but rather in the same way that a child would acquire them in a L1 phonology. For German children learning English as a L2, those elements which did evidence negative transfer were

the stressed and unstressed vowels/vowels, the syllabic and non-syllabic consonantoids except /r/ possibly /ra/. The acquisition of the latter two, especially /r/, was parallel to the development sequence when English is acquired as L1.

Lonna Dickerson (1974) sheds considerable light on some of the reasons why contrastive analysis may be so limited in predicting the shape of segmental IL phonology. Dickerson studied the IL phonologies of Japanese university students learning English as a second language. Her analysis is different from any of the preceding ones in that it takes into account the effect of phonological variation in both the NL and IL on the process of acquisition of the TL. Her central claim is that the acquisition of a L2 phonology proceeds by the movement of variations within the environments of variable word classes. In this study she makes no claim as to the directionality of the variable IL phonological system, the rate of its change, or the influence of any community of IL speakers on its development; her focus is on the mechanism whereby acquisition of the L2 proceeds. Dickerson concludes:
The learner's performance is essentially the output of a variable system. As such, predictions about this output which deny its source, as the CA [contrastive analysis] hypothesis does, will always be rejected.

One reason that the CA hypothesis will always be rejected is that positive and negative transfer do not work invariably but variably.

Note here that Dickerson is not absolutely rejecting the notions of positive and negative transfer in shaping an IL phonology. In fact, she clearly finds evidence for the existence of transfer in her data.

In many cases the learner's output does contain phones which are those used in the NL. Furthermore, they appear in environments which are often similar to NL environments. There is every reason to believe that these variants originate in the NL.

She is simply stating that these processes operate variably as they interact with other processes and constraints. Wayne Dickerson suggests (personal communication) the following variable rule as a representation of Lonna's findings as to the linguistic constraints on the production of [s] and [z] by Japanese students learning English as a second language:

\[
\begin{align*}
\text{ant} & - > \text{ant} \\
\text{cor} & < \text{cor} \\
\text{cont} & < \text{cont} \\
\text{str} & < \text{str}
\end{align*}
\]

\[
> / < \text{seg} > \text{syl} > \text{bk} > \text{syl} > \text{bk} > \text{high} > \text{back}
\]

To break this rule down, we can see that in this Japanese learner's interlanguage, certain phonological environments are more favorable to the production of [z] than others. One of the most difficult environments is when this segment occurs initially in front of a high front vowel:

\[
\emptyset = \begin{cases} 
+\text{syl} \\
+\text{high} \\
-\text{back}
\end{cases} 
\quad \text{(e.g., sec, zip)}
\]

Even harder for a Japanese speaker is the [s] or [z] sound in a medial position, between an initial front vowel, and a following high front vowel:

\[
\begin{cases} 
+\text{syl} \\
-\text{back}
\end{cases} \quad \begin{cases} 
+\text{syl} \\
+\text{high} \\
-\text{back}
\end{cases} \quad \text{(e.g., easy, Lassie)}
\]

Most difficult is the medial position between an initial central back vowel and a following high front vowel:

\[
\begin{cases} 
+\text{syl} \\
+\text{back}
\end{cases} \quad \begin{cases} 
+\text{syl} \\
+\text{high} \\
-\text{back}
\end{cases} \quad \text{(e.g., music, position)}
\]

W. Dickerson (1977) develops this notion of sociolinguistic variation in IL phonology further, showing, in his longitudinal analysis of the IL phonology of a single Japanese learner of English as a second language, not only that the usage of phonological variants was correlated with linguistic environment for this learner, but also that progress was attained over time by the increasing approximation of the TL variants in each relevant linguistic environment. Further, he shows that nonlinguistic constraints such as the nature of the task (whether free speaking, dialogue reading, or word list reading) produce systematic style shifting in the interlingual phonology. He expresses such nonlinguistic constraints in this manner:

\[
\emptyset = f(\text{Proficiency Level})(\text{Style: WL > DR > FS})
\]

The similar variation observed by Nemser (1971) in learner performance on various experimental tasks could be systematically described by variable rules. Other researchers, such as Schmidt (1977), have also begun to explore the influence of sociolinguistic variation on IL phonology. For further details on the variable analysis of IL phonology, see W. Dickerson (1976), and Dickerson and Dickerson (1977).

It is this writer's opinion that some sort of variable system of phonological description will go far toward accounting for the relative importance of all the processes we have considered thus far in shaping an IL phonological system: negative transfer from the NL, L1 acquisition processes, overgeneralization, approximation, as well as certain external constraints such as inherent difficulty of the TL system, or, as we shall see next, even psychological constraints.

The phonological environments described by Dickerson as "favorable" to the production of a TL sound might be favorable due to transfer effects—i.e., the existence or nonexistence of those environments in the NL—or to more universal effects. As Johansson points out, some aspects of the TL (Swedish higher vowels and some long and back vowels) seemed to be inherently more difficult, and certain processes seemed to operate equally for all learners, such as the tendency of the articulators toward a neutral rest position. Tarone's research (1972, 1976) explores another area of hypothesized universal physiological constraint, which relates to the constraints on the syllable structure of IL. A language transfer hypothesis would maintain that the syllable structure of the NL would be transferred in the learner's attempt to produce the TL. So, if the NL contains only syllables of a vowel-consonant (VC) type, such as [ab], [ik], and so on, the CA hypothesis would predict a tendency for the L2 learner to transform the TL syllables into VC types. Another hypothesis as to the processes shaping IL syllable structure would be that L1 learning processes are reactivated. So, different syllables of the TL would be simplified by the L2 learner in the same way that they are by the L1 learner. In order to understand this position, it may be helpful to consider a theoretical paper by D. K. Oller (1974) in which he compares the process of consonant cluster simplification used in L1 acquisition and L2 acquisition. His conclusions are limited in that his data...
on L2 acquisition are gleaned from anecdotal comments in the literature of the 1960s. However, they are interesting. According to Oller, epenthesis (vowel insertion) is a characteristic strategy of L2 learners. However, in L1 acquisition of phonology, learners under three years of age usually simplify by reducing or deleting difficult sounds, e.g.:

(a) cluster reduction: blue → bue
(b) final consonant deletion: big → bi
(c) weak syllable deletion: banana → nana

But Oller’s understanding of the L2 literature is that L2 learners operate quite differently:

(a) epenthesis is used rather than cluster reduction: tree → teree
(b) epenthesis is used rather than final consonant deletion: big → bigu
(c) weak syllable deletion was reportedly uncommon

Thus epenthesis seems to have been a favored strategy for L2 learners, while consonant deletion was favored for L1 learners. This epenthesis could be a result of transfer from the NL. Tarone supports another hypothesis, however, arguing that the simple open CV syllable may be a universal articulatory and perceptual unit such that the articulators tend to operate in basic CV programs in all languages. Different languages elaborate on this basic program in various ways, adding different combinations of permissible initial and/or final consonants. However, researchers such as Kozhevnikov and Chistovich (1965) have shown that in stressful situations of various kinds, speakers tend to revert to the simple CV pattern of pronunciation in their NL—i.e., they stutter. Tarone’s (1976) research shows in L2 learners a similar tendency to revert to a CV syllable pattern in IL. She analyzed the spontaneous speech of six students learning English as a second language—two native speakers each of Cantonese, Korean, and Portuguese. These adult subjects were asked to describe a series of pictures. While the dominant process influencing the IL syllable structure seemed to be transfer from the NL, the preference for the CV syllable clearly operated as a process independent of the transfer process. Subjects would simplify TL consonant clusters which occurred also in their NL, reducing them to simpler CV patterns. Second language learners used both epenthesis and consonant deletion to accomplish this CV pattern.

Thus, one of the universal constraints which may shape phonological environments favorable or unfavorable to the production of TL-like sounds may be the physiological constraint of the articulators’ tendency to operate in a CV-like, close-open patterns.

Cece-Murcia’s (1977) observations of a child learning English and French simultaneously have revealed another process which is clearly operating to shape IL phonologies—a process not clearly predictable by either contrastive analysis or error analysis—the process of avoidance. Cece-Murcia analyzed the spontaneous speech of the learner and observed that her daughter consistently attempted to avoid what were for her physiologically difficult forms. Living in a bilingual home, the child tended to prefer those lexical items which were easiest to pronounce, and thus mixed languages. For instance, she had a great deal of difficulty with fricatives, and therefore consistently used the lexical item “couteau” and avoided “knife.” And, rather than say “football,” she created a new word, “piedball,” and insisted on using it for a long time. Here again, there are clearly some physiological constraints—in this case, developmental ones—which activate a process—in this case, a process of avoidance—to shape a learner’s IL phonology.

The only other study on IL phonology I know of which relates to the issue of the processes shaping IL phonology is Backman’s (1977) study on intonation in interlanguage. It describes theinterlanguages of eight Spanish-speaking university students learning English. The data were collected by asking the subjects to listen to English dialogues on tape (the dialogues were not made up by the experimenter, but were dramatizations of earlier conversations which had really occurred) and then to repeat them on tape. Backman found that 78 percent of the learners’ utterances had inappropriate intonation. The learners generally used a smaller overall range of pitch: smaller pitch rise, especially on yes-no questions and prefinal rises to stressed syllables; a higher pitch for unstressed syllables; and a movement of pitch prominence to the left in declarative statements and wh-questions. Not all of these characteristics could be accounted for in terms of transfer. Backman concludes:

The Spanish [NL] data then had explanatory power in certain respects; it did not however provide all the answers for the subjects’ intonation errors.

Thus, even in the area of prosodic features, it would appear that the process of transfer from the NL is by no means the only process operative, and that an adequate theory of acquisition of L2 phonology must take other processes and constraints into account. To summarize, then, the following processes are claimed at this time to be operative in shaping IL phonology:

1. negative transfer from NL (all studies)
2. first language acquisition processes (Wode, Tarone)
3. overgeneralization (Johannson)
4. approximation (Johannson, Nemser)
5. avoidance (Cece-Murcia)

And, the following constraints appear to be operative:

1. the inherent difficulty of certain TL sounds and phonological contexts (Johannson)
2. the tendency of the articulators to rest position (Johannson)
3. the tendency of the articulators to a CV pattern (Tarone)
4. the tendency to avoid extremes of pitch variation (Backman)
5. emotional and social constraints (Dickerson, Schmidt)
The Dickerson studies suggest that all these processes and constraints may interact with one another in such a way that the rules of a learner’s IL phonology must be considered variable. The degree of influence which these processes and constraints have on an IL phonology must be experimentally determined and incorporated into a variable rule system which can accurately describe IL phonology.

THE FOSSILIZATION OF INTERLANGUAGE PHONOLOGY

One of the central issues in the study of interlanguage phonology is that of the fossilization of IL phonologies in adult L2 learners. There are two related questions here: the first has to do with whether this fossilization is inevitable when adults learn a L2, and the second has to do with the causes of such fossilization. Researchers are divided in their answers to both questions.

First, is phonological fossilization inevitable for adult L2 learners? Scovel (1969) says yes; he maintains that no adult ever achieves perfect native pronunciation in a L2. He has labeled this the “Joseph Conrad phenomenon,” in honor of the famous British author who achieved unquestioned native-like fluency in the syntax of English, his second language—yet retained a Polish accent all his life. Scovel has gone so far, in these days of inflation, as to offer a free dinner to anyone who can show him an individual who learned a L2 after puberty and who now speaks that L2 with perfect native pronunciation. As of April 1977 no one has been able to produce such an individual.

Other researchers disagree with Scovel. Hill (1970) maintains that this kind of fossilization is by no means inevitable, being the result of social and cultural factors in Western culture. She points to native peoples like the Vaupes Indians of the Amazon and the Siamese of New Guinea, who reportedly learn several L2s as adults and achieve native-like fluency. However, evidently Scovel remains unconvinced; presumably, he has not yet met one of these individuals and been able to determine the degree of acceptability of their accents. More recently, Neufeld (1977) has experimented with methods of teaching L2 pronunciation which, he maintains, are successful in helping adults to acquire native or near-native proficiency in pronunciation of new languages. (More will be said about Neufeld’s technique later.) It is not known at this writing whether Scovel has had a chance to deliberate upon the nativeness of the pronunciation of Neufeld’s subjects. Hence, at present, it would appear that the question of the inevitability of phonological fossilization in adults is still undecided.

The second question is related: what causes phonological fossilization to occur? There are several possible explanations. Some of them fall into a general category of physiological explanations. For example, a popular explanation among L2 learners themselves seems to be that when learners get older “their tongues get stiff”—that is, the muscles and nerves of the tongue and mouth have been practicing the same set of pronunciation habits for years. This theory might maintain that the nerves and muscles necessary for the pronunciation of new L2 pronunciation patterns have atrophied so that native-like pronunciation is impossible. I am aware of no research evidence that this sort of atrophy takes place. Another physiological explanation, originally supported by Scovel (1969), is based on Lenneberg’s (1967) suggestion that “lateralization”—the completion of cerebral dominance—affects the learning of language. Somehow, with lateralization the brain loses its capacity for language learning, and this loss affects the pronunciation of the L2 more than the syntax or vocabulary of the L2. However, recently some questions have been raised about the lateralization hypothesis. Krashen (1973) reanalyzed data used by Lenneberg and also dichotic listening data, and showed that lateralization actually seems to take place much earlier—before the age of five, in fact—than the critical period for language learning, which is commonly supposed to occur at around puberty.

Another group of explanations can be grouped as pointing to psychological causes of phonological fossilization. In fact, Krashen has his own theory about the causes of fossilization. Krashen (1977) maintains, as does Rosansky (1975), that the close of the critical period is related to the onset of Piaget’s stage of formal operations. In this stage of cognitive development, adolescents begin to consciously construct abstract theories about the world. Hence, they tend to learn L2s, that is, to abstract rules of grammar and pronunciation and consciously apply them, rather than to acquire L2s, that is, to activate the same unconscious processes that children do in acquiring a L1. The formal operations type of psychological explanation for phonological fossilization is being strongly pushed at present. However, to my knowledge, it does not explain the Joseph Conrad Phenomenon—that is, the learner who acquires the syntax and vocabulary of the L2 but not the pronunciation. Why should formal operations affect only the pronunciation, and not the syntax or morphology in cases such as these?

Another psychological explanation of phonological fossilization in adults is based on psychological habit formation and is related to the language transfer question. That is, theoreticians have claimed that language transfer has its strongest effect on the pronunciation of a second language. Though we have seen that this claim has been considerably weakened by recent research results, there has been no comparative study to determine the relative influence of language transfer on pronunciation as opposed to syntax or morphology of a IL. If this claim proves to be validated by such a comparative study, then we might say that it is psychological habit formation and negative transfer that for some reason selectively operate to make IL phonology singularly resistant to change. An interesting experiment was done recently which was essentially based on a psychological habit formation hypothesis. Neufeld (1977) reports on a study in which he experimentally tested a new technique for teaching L2 pronunciation to adults. Essentially, he maintains, the problem is that we expose adults to inappropriate learning situations where they form inaccurate acoustic images of the target language sound patterns. Once formed, those acoustic images are set,
and so are the learners’ pronunciation patterns. (It is not clear from Neufeld’s discussion why adults are negatively affected by malformed acoustic images and children are not.) In his experiment, Neufeld instructed 20 young adults in three non-Indo-European languages—Chinese, Japanese, and Eskimo. The students watched videotaped lessons consisting of 100 stock phrases in these languages. They were given no explicit instruction in the meaning or pronunciation of the utterances or the grammatical rules of the languages, since the purpose of the study was to force the subjects to focus on the sound patterns of the languages. For the first part of the study the subjects merely watched and listened and were prevented from speaking. Later they were asked to produce intonational contours of the utterances they heard and saw correct contours for them on the videotape. Later they were allowed to whisper repetitions of what they heard. Only in the last three lessons of the 18 were the subjects allowed to repeat the utterances in a normal voice; by this time it was assumed that they had received enough accurate input to have formed a correct acoustic image of the languages and were unlikely to destroy that image by their own pronunciation. Neufeld’s subjects (Ss) then recorded the phrases on tape, and native speakers of the three languages judged the nativeness of the subjects’ pronunciation. Almost half the Ss were judged to have native or near-native pronunciation. Clearly, this experiment needs to be expanded so that we can judge whether their pronunciation ability persists when they are using the TLs for real communication. But Neufeld’s results are most interesting and indicate some future directions for research. Research on the processes underlying IL phonology indicates that language transfer is only one of several processes; hence one would surmise that this kind of psychological habit formation theory of IL phonological fossilization would be similarly limited in its explanatory power. But to the degree that transfer is an effect, the psychological habit formation theories must be accorded validity.

A third kind of explanation very different from psychological habit formation uses the affective argument and focuses on the adult learners’ essential lack of empathy with the native speakers and culture of the L2. Guiora et al. (1972) attempted to artificially increase the empathy levels of L2 learners by administering gradually increasing amounts of alcohol. They found that the learners’ pronunciation of the TL improved up to a certain point and then, as subjects drank greater amounts of alcohol, rapidly deteriorated. Guiora et al. feel that IL pronunciation is a more sensitive indicator of empathy than either syntax or morphology (and Dickerson’s comments on the influence of speakers’ mood on pronunciation might support this feeling). Since children have more fluid language ego boundaries, they are much more likely to identify with speakers of a TL than are adults, who have more rigid language ego boundaries. Essentially, adults have decided on their cultural identity and use their accent to identify themselves appropriately. They essentially have no motivation to change their accent when it communicates perfectly well who they are. Hill (1970) implicitly supports a similar position when she points to native tribes whose cultures highly value multilingualism and encourage this capacity in adults. Where the culture encourages adults to achieve multilingualism, they achieve it, according to Hill. However, Hill’s tribespeople have not been studied by L2 acquisition researchers to determine the exact extent of their native-like proficiency. Another plausible explanation for Guiora’s results is simply that muscle relaxation induced by the alcohol allowed the subjects to achieve better articulation of the TL sounds (H. D. Brown, personal communication).

However, intuitively, the socio-emotional factors would seem to be especially powerful in determining degree of proficiency in pronunciation. These factors are hard to measure unambiguously in an experimental setting, but there are many anecdotes suggesting their power. For one, there have been many observations that children are particularly susceptible to an at-times-cruel form of pressure to conform to (empathize with?) their peer group in all matters, including pronunciation. In her work on children at play in L2 learning situations, Peck (1977) has quite clearly shown that mockery of aberrant learner accents is a very common and particularly effective form of peer teaching. It is clearly the case that children mock the accents of child L2 learners directly and frequently, but that adults do not directly mock the accents of adult L2 learners. Could this be one of the reasons why children acquire native-like accents and adults do not? The possible implications for teaching are appalling; negative reinforcement has been most unpopular for years. Guiora’s approach may have more pleasant implications for the use of socio-emotional factors in facilitating the learning process.

But here again, the causes of phonological fossilization are not clear. There seems to be persuasive evidence supporting several different forces active in causing this phenomenon. There seems to be less and less evidence for physiological sources of the problem. The formal operations argument and the psychological habit formation argument both seem to have some potential explanatory power, but are limited in important ways. The affective factors arguments, dealing with empathy and cultural identity, seem to provide some very strong directions for future research.

SUMMARY

We have seen that much productive research has taken place recently on different aspects of interlanguage phonology. Most of this research has focused on the collection of data and the analysis of this data in an attempt to determine the nature of the processes shaping interlanguage phonology, and the causes of fossilization of interlanguage phonology. While much progress has been made, there are many questions which remain to be answered:

What are the relative influences of such processes as transfer, overgeneralization, avoidance, and first language acquisition processes on the shape of IL phonology?
In viewing interlanguage as a variable system, can we account for those relative influences?

What are the physiological and social constraints on IL phonology?

Is it possible for adults to acquire a L2 without an accent? If not, why not?

In our attempts to answer questions such as these, undoubtedly we will learn much about the complex interrelationships of language, mind, body, and society in the process of second language acquisition.

NOTE

1. Adjémian (1976) suggests that the mental processes commanding muscle control may be slower to change than cognitive processes governing syntax; thus "habit formation" is not the only possible explanation here.

REFERENCES

Dickerson, W. 1976. "The Pscholinguistic Unity of Language Learning and Language Change," Language Learning, 26, 2, 215-231. (Also this volume.)

Tarone, E. 1976. "Some influences on interlanguage phonology," IRAL and Working Papers in Bilingualism, 8, Feb., 87-111. (Also this volume.)