FOSSILIZATION: CESSATION OF SECOND LANGUAGE ACQUISITION

ROBERTA A. WELCH

Introduction

"It has long been noted that foreign language learners reach a certain stage of learning - a stage short of success - and that learners then permanently stabilize at this stage."[1] To describe this cessation of language learning, Selinker (1972) used the term "fossilization." This paper is a survey of this important concept in second language acquisition. The first of the three sections of this review is concerned with the nature and possible sources of fossilization. The second discusses pedagogical implications. The third section examines whether or not fossilization can be overcome.

The Nature and Sources of Fossilization

In his seminal article on interlanguage Selinker (1972) defines fossilization in the following terms: "Fossilizable linguistic phenomena are linguistic items, rules and subsystems which speakers of a particular NL (native language) will tend to keep in their IL (interlanguage), no matter what the age of the learner or amount of explanation and instruction he receives in the TL (target language)."[2] He contends that those items, rules, and subsystems are fossilizable as the result of five central processes, namely, language transfer, transfer of training, strategies of second language learning, strategies of second language communication, and overgeneralization of the TL linguistic material.

For example, fossilization can take place if the learner follows a strategy of communication which dictates that she stop learning when she has acquired enough of the TL to meet her communicative needs. (For a case study of such a learner see Shapira, 1978.) Adjemian (1976) gives an example of when fossilization might occur as a result of a learning strategy: If the TL rule is too difficult or if the learner does not have enough data to formulate the rule correctly, she might adopt an avoidance strategy and use an alternate IL structure. Selinker (1972) concludes that combinations of the five processes listed above can produce totally fossilized IL competences.

Twenty years later Selinker (1992) notes that researchers looking into the formation and fossilization of IL should take into consideration the multiple effects principle of second language acquistion. That principle states that "when two processes work in tan-

dem there is greater chance for stabilization of forms leading to possible fossilization."[3] Examples he gives of processes working in tandem with language transfer are language universals (see Zobl, 1980) and salience in the input (see Harley and Swain, 1984).

Selinker (1972) uses another term - backsliding - to refer to fossilizable structures that tend to "remain as potential performance, re-emerging in the productive performance of an IL even when seemingly eradicated."[4] Backsliding can occur when the learner's attention is focused on a new subject or as a consequence of emotional factors such as anxiety. Adjemian (1976) elaborates on the distinction between the two terms. In the case of fossilization there is no active alternative form or rule for the fossilized one in the learner's competence. Whereas in the case of backsliding, there is an active alternative form or rule, which may be the correct TL one, in her competence. He further explains that backsliding does not only pertain to learners who have fossilized, but it also occurs with learners who are still evolving toward the TL norm.

In 1976 Vigil and Oller published "the first explicit and testable theoretical claims regarding fossilization."[5] Their model makes a distinction between the affective and cognitive dimensions of language use and discusses the effect of expected and unexpected feedback. They claim that "expected negative feedback on the cognitive dimension... is the principle destabilizing factor in the development of learner grammars."[6] Conversely, receiving expected positive feedback will tend to result in fossilization; "unless learners receive appropriate sorts of cognitive feedback concerning errors, those errors can be expected to fossilize."[7]

Selinker and Lamendella (1979) do not share Vigil and Oller's (1976) conviction that extrinsic feedback factors can be identified as the primary source of fossilization in IL learning. There are other factors internal to the learner which can affect fossilization, e.g., motivation, as well as innate and universal factors (see Brown, 1987). Furthermore, Selinker and Lamendella (1979) distinguish fossilization from stabilization, maintaining that if subsequent destabilization of linguistic forms, features, or systems can be observed, then the issue is a plateau in IL learning, not fossilization.

Sociolinguistic factors, such as social identity, have also been considered as a source of fossilization (see Preston, 1989). Schumann's (1978) pidginization hypothesis predicts that pidginization will persist in the speech of second language learners, i.e., an IL far from the TL norm will become fossilized, when the learners are socially and psychologically removed from the TL culture. Schumann cites the case of Alberto to demonstrate that instruction in the TL is not "powerful enough to overcome the pidginization engendered by social and psychological distance."[8] On the other hand, Schmidt's (1983) Wes, another celebrated case of pidginization, fossilized in spite of a close to optimal social-psychological profile (Long, 1985). One factor lacking in both of these cases, as well as in the case of the Pidgin-German of foreign workers in Germany, was that of written input. VanPatten (1988) considers it unlikely to expect adult naturalistic learners to develop anywhere near full control of the TL if they do not interact with written input designed for native-speaking adults.

As early as 1975, Selinker, Swain, and Dumas, upon examination of children completing their second year in a Canadian French immersion program, extend Selinker's interlanguage hypothesis to include child second language acquisition settings where native-speaking peers of the TL are absent. In settings where peers are present, developmental errors are eradicated over time; where they are absent there is some indication that errors become fossilized. Although stability in the IL of these children learning in sociolinguistic isolation remained to be examined over time, the authors wonder at what point their IL might evolve towards a pidgin or dialect of its own.

Harley and Swain (1984), however, do not find evidence of long-term fossilization of grammatical subsystems among French immersion students up to grade 10. For example, although there was little or no apparent development of a number of features of the French verb system between grades 1-4, significant development in those areas occurred between grades 4 and 10. Hammerly (1987, 1992), investigating learners who had had long exposure in various immersion programs, refutes their claim. His conclusion is that the output of learners at all levels was linguistically faulty. His evidence indicates that when learners receive sufficient comprehensible input and are encouraged to communicate beyond their limited linguistic competence, they settle for comprehensible functional communication and fossilize a faulty IL - a possibly terminal classroom pidgin.

Age or maturation state is another important factor to be taken into account when considering the source of fossilization. Scovel (1988) views a foreign accent as the best example of fossilization "because it is so pervasive in speech, and because it contrasts so starkly with the otherwise native-like and errorless language use of superbly proficient foreign language speakers." [9] (He refers to this as the Joseph Conrad phenomenon.) Scovel argues that due to sociobiological reasons there is a critical period - puberty - after which the ability to sound like a native speaker is lost. His answer as to "whether there exists a critical period for syntax ranges from a potential maybe to a probable no." [10]

In his survey of age-related differences in second language research, Long (1990) cites evidence supporting a sensitive, not critical, period for learning. To achieve native-like competence in phonology, second language acquisition must begin before age 6 for most learners, and before 12 for the remainder. The limit for native-like morpho-syntax is before age 15, and for the remaining linguistic domains, somewhere in between. Reviewing various explanations for the sensitive period, Long tentatively accepts "a role for neurological factors with cognitive consequences." [11] Ioup and Tansomboon's (1987) study of adult learners of Thai adds support to Long's conclusion. They attribute their subjects inability to achieve native-like control of Thai tone to the adult learner's need to process linguistic data using analytic cognitive strategies associated with the left hemisphere of the brain.

Long (1990) concludes his review with a call for more research, especially that focusing on very advanced learners. Hyltenstam's (1988) study of near-native adolescent second language learners of Swedish meets that qualification. His results indicate that fossilization in the lexical domain can occur not only among learners who start their acquisi-

tion after puberty, but also among younger learners. He suggests that there may be "no critical point, but just a continuum, so that the older the learner is by the onset of acquisition, the more fossilization will make itself evident."[12] He allows, however, for an alternative interpretation, i.e., that the fossilized features in the population of his study were really not fossilized at all, but were instances of error phenomena that would disappear over time, although at an extremely slow rate.

Summarizing this section on the nature and sources of fossilization, I will turn to Selinker and Lamendella's (1981) update of the IL hypothesis. They view fossilization as a complex phenomenon that cannot be accounted for by any single factor. "Different levels (and different discourse domains) of language structure may be differentially fossilized at varying degrees of approximation to TL norms."[13] The first point at which fossilization is likely to occur is when the interactive needs of the learner are satisfied. Interactive needs refer to both communication needs (cf. Vigil and Oller's feedback model, 1976) and sociocultural needs (cf. Schumann, 1978). Another point at which IL learning is apt to cease is when the "representational" needs of the learner are satisfied, i.e., when she has an internal cognitive TL framework that enables her to represent knowledge of the world in short and long-term memory. The upper bound on fossilization "involves biological factors which are based in the human genotype;"[14] it seems likely that the complex factors attending the onset of puberty could bring an end to the sensitive period for second language acquisition.

Pedagogical Implications

In 1988, three articles (Hammond, Major, VanPatten) appeared that included discussions of Higgs and Clifford's 1982 fossilization hypothesis which claims that postponing linguistic accuracy leads to fossilization. It is "when students are regularly rewarded for linguistically inaccurate but otherwise successful communication of meaning or intent that the threat of proactive interference in the form of fossilization looms largest."[15] The implication is that students who are taught grammar inductively through a communicative method fail to learn it accurately and end up fossilizing incorrect patterns (Hammond, 1988). The Higgs and Clifford assertion influenced the American foreign language teaching profession to such a degree that "fossilophobia" became widespread. Teachers were convinced that fossilization would result if grammar were not taught and if linguistic accuracy were not checked from the very start of language instruction (VanPatten, 1988).

VanPatten (1988) attacks the hypothesis on the grounds that the authors provide no empirical evidence to support their claim. In addition, he doubts that sufficient time had been allowed to witness improvement, since it seems that the bulk of experiential data in the Higgs and Clifford study came from Foreign Service Institute students who were in intensive language programs. It is likely that the students had reached a plateau stage, and it cannot be said with any degree of assurance that they had fossilized.

Hammond (1988) attempted to investigate the claim that communicative methods

that taught grammar inductively would result in inaccurate grammar acquisition. He compared 60 classes of American university students learning Spanish as a foreign language. He found that those who were taught grammar by a traditional method stressing grammatical accuracy did not score significantly higher on traditional discrete-point examinations than those who were taught by the Natural Approach, a communicative teaching methodology. His study cannot be considered a true comparison, however, since the students taught in a communicative mode also had written homework assignments that included traditional exercises.

Major (1988) accepts the Higgs and Clifford hypothesis, refers to the work of Vigil and Oller (1976), and concludes that "positive cognitive feedback is necessary in order to internalize correct forms and negative cognitive feedback, or error correction, is necessary to prevent fossilization of incorrect forms."[16] He maintains that, by logical implication, feedback in the sociocultural domain is important in preventing fossilization of use. Major's general premise is that classroom methods need to emphasize both form and function, as well as include feedback in both of those domains.

Following his claim that current immersion programs result in fossilization, Hammerly (1987) suggests a "better road to bilingualism."[17] First, an exploratory course covering the languages and peoples of the world would be offered in the native language. Second, semi-intensive systematic instruction would be provided to build a solid foundation, particularly in the structure of the language. The final stage, if possible, would be total immersion or submersion.

An alternate approach would be to maintain the basic immersion program, but to take steps to bring the learners' production closer to TL norms. After analyzing the learners' language for persistent errors, teachers could provide for increased input of the structures that needed to be corrected as well as for extended output through student practice. For example, a history lesson could present an ideal opportunity for contextualized focus on the conditional or the past tense, both problem structures for French immersion students (Snow et al., 1989). Similarly, Harley and Swain (1984) see a twofold need: (1) more focused TL input showing the formal and semantic contrasts involved and (2) activities requiring the learners to produce the forms in meaningful situations. They suggest using computer games as a way of focusing on specific features. They also believe that there is room for some selective grammatical explanation.

Day and Shapson (1991) tested the effect of integrating formal and functional approaches. Materials were developed for an experimental study designed to teach the French conditional to grade 7 students. [Harley and Swain (1984) had found that accuracy rates for this form were only 15%, 41% and 56% for students in grades 4, 6, and 10 respectively.] The results of the study show that learners who had experienced the integrated approach made significantly higher gains in their ability to use the conditional in writing than those in regular immersion classes. Statistically significant gains were not found for speaking, although some benefit was revealed in this domain as well. Day and Shapson's study indicates that fossilization might be prevented by curriculum intervention that pro-

vides additional input and promotes opportunities for the learners to use the TL to express higher level cognitive functions.

Overcoming Fossilization

This section will look at studies dealing with attempts to overcome fossilization. Three programs that have been successful in changing the pronunciation of nonnative-speaking professionals in the United States (Acton, 1984; Browne and Huckin, 1987) and francophone civil servants in Canada (Ricard, 1986) are described. Browne and Huckin (1987) worked with 45 nonnative technical researchers of sixteen language backgrounds at General Motors Research Laboratories. The program consisted of a series of fourteen, one-to-one tutorials with systematic follow-up over a period of two years. Using a cognitive approach that was rated highly effective by their technical / professional research clientele, the Browne-Huckin program concentrated on helping the participants develop a three-part process of speech awareness, self-observation, and self-monitoring. By the end of the course, the participants had improved, and 80% elected to continue with the follow-up work.

Acton (1984) outlines a method, a 48-hour course spread over twelve weeks, that is appropriate for classes of up to twenty students, making it more feasible and economical than the tutorial program described above. He summarizes his approach as a progression of four steps. (1) Learners come to understand the link between internal affective states and pronunciation, along with the idea that changing pronunciation might result in changes in related behavior, e.g., nonverbal behavior. (2) They acquire at least a conscious control of problematic sounds and processes through formal exercises and oral readings. (3) Learners are helped to find ways to integrate new or improved behaviors on the job, using native-speaking informants at their workplace. (4) They finish the course reasonably well equipped to continue making progress on their own. The 50% who completed Acton's program and did enough of the work to demonstrate significant long-lasting change did not necessarily show radical improvement in the pronunciation of individual phonological segments; however, "the change in overall intelligibility, in virtually all contexts,"[18] was unmistakable.

The Advanced Language Training Program of the Canadian federal government divided its course into an academic phase of four months intensive study followed by an on-the-job assignment phase of twenty months in which students use the TL at least 50% of the time. The course worked on three levels simultaneously: (1) phonological aspects of English applicable to advanced francophone learners, (2) global strategies intended to incorporate principles of self-directed learning, and (3) specific "hands-on" techniques, one of which, oral reading, constituted the backbone of the course. Concluding her report, Ricard (1986) states, "Given genuine motivation, a little elbow grease, and a combination of meaningful activities, students who have been speaking English for years can go beyond fossilized pronunciation habits."[19]

The evidence from these three reports show that it is possible to overcome fossiliza-

tion in the phonological realm. Therefore, there is no reason to believe that "the interlanguage pronunciation of fossilized learners is, indeed, etched in stone."[20] Brown (1987) suggests that a better metaphor than fossilization might be "'cryogenation' - the process of freezing matter at very low temperatures; we would then have a picture of a situation that could be reversed, given some warmth, of course!"[21]

On the other hand, Mukattash (1986) does not present such an optimistic picture concerning the fossilization of certain grammatical structures by advanced Arab learners of English as a foreign language. He found that explicit and systematic grammatical error correction did not result in de-fossilization. Therefore, he concludes that "if research proves that certain error-types are insusceptible to de-fossilization, then the time and effort expended in the correction of such errors may be more fruitfully employed in the teaching of new material."[22]

Conclusion

In the two decades since Selinker (1972) first used the term fossilization, second language acquisition researchers and classroom teachers have sought explanations for it and have been concerned about the pedagogical implications. They have not been able to pinpoint exactly what causes fossilization nor predict precisely when it will occur. Longitudinal studies, including those of learners who go on to advanced levels, are needed to analyze learner language over time. A major problem when seeking observable evidence for fossilization is to determine if the learner has just reached a plateau or if permanent cessation of learning has resulted. Immersion studies show that development can take place very slowly. Those studies indicate, however, that some emphasis on form is necessary to prevent a permanent pidginized classroom language. Offering promise for language teachers are the reports that show that fossilization in the realm of pronunciation can be overcome, although it remains to be seen if programs that go beyond fossilization in other linguistic areas can be designed.

Notes

(1) Bley-Vroman, 1987, p. 22.

(2) Selinker, 1972, p. 177.

(3) Selinker, 1992, p. 262.

(4) Selinker, 1972, p. 178.

(5) Selinker and Lamendella, 1979, p. 363.

(6) Vigil and Oller, 1976, p. 281.

(7) Ibid., p. 294.

(8) Schumann, 1978, p. 268.

(9) Scovel, 1988, p. 102.

(10) Ibid., p. 171.

(11) Long, 1990, p. 280.

(12) Hyltenstam, 1988, p. 81.

(13) Selinker and Lamendella, 1981, p. 214.

(14) Ibid., p. 217.

(15) VanPatten, 1988, p. 245.

(16) Major, 1988, p. 89.

(17) Hammerly, 1987, p. 399.

(18) Acton, 1984, p. 81.

(19) Ricard, 1986, p. 249.

(20) Acton, 1984, p. 82.

(21) Brown, 1987, p. 186.

(22) Mukattash, 1986, p. 201.

REFERENCES

Acton, W. 1984. Changing Fossilized Pronunciation. *TESOL Quarterly*, 18, 71-85.

Adjemian, C. 1976. On the Nature of Interlanguage Systems. *Language Learning*, 26, 297-320.

Bley-Vroman, R. 1987. The Fundamental Character of Foreign Language Learning. In Rutherford, W., & Sharwood Smith, M. (Eds.), *Grammar and Second Language Teaching* (pp. 18-30). Newbury House.

Brown, H. 1987. *Principles of Language Learning and Teaching*, 2nd Ed., Prentice Hall Regents.

Browne, S., & Huckin, T. 1987. Pronunciation Tutorials for Nonnative Technical Professionals: A Program Description. In Morley, J. (Ed.), *Current Perspectives on Pronunciation* (pp. 41-57). TESOL.

Day, E., & Shapson, S. 1991. Integrating Formal and Functional Approaches to Language Teaching in French Immersion: An Experimental Study. *Language Learning*, 41, 25-58.

Hammerly, H. 1987. The Immersion Approach: Litmus Test of Second Language Acquisition through Classroom Communication. *Modern Language Journal*, 71, 394-401.

Hammerly, H. 1992. The Need for Directed Language Learning in the FL Classroom. *Studies in Second Language Acquisition*, 14, 215-16.

Hammond, R. 1988. Accuracy Versus Communicative Competency: The Acquisition of Grammar in the Second Language Classroom. *Hispania*, 71, 408-17.

Harley, B., & Swain, M. 1984. The Interlanguage of Immersion Students and Its Implications for Second Language Teaching. In Davis, A., Criper, C., & Howatt, A. (Eds.), *Interlanguage* (pp. 291-311). Edinburgh University Press.

Hyltenstam, K. 1988. Lexical Characteristics of Near-native Second-language Learners of Swedish. *Journal of Multilingual and Multicultural Development*, 9, 67-84.

Ioup, G., & Tansomboon, A. 1987. The Acquisition of Tone: A Maturational Perspective. In Ioup, G., & Weinberger, S. (Eds.), *Interlanguage Phonology* (pp. 333-49). Newbury House.

Long, M. 1985. A Role for Instruction in Second Language Acquistion. In Hyltenstam, K., & Pienemann, M. (Eds.), *Modeling and Assessing Second Language Acquisition*. Multilingual Matters.

Long, M. 1990. Maturational Constraints on Language Development. *Studies in Second Language Acquisition*, 12, 251-85.

Major, R. 1988. Balancing Form and Function. *IRAL*, 26, 81-100.

Mukattash, L. 1986. Persistance of Fossilization. *IRAL*, 24, 187-203.

Preston, D. 1989. *Sociolinguistics and Second Language Acquisition*. Blackwell.

Ricard, E. 1987. Beyond Fossilization: A Course on Strategies and Techniques in Pronunciation for Advanced Adult Learners. *TESL Canada Journal / Revue TESL du Canada*, Special issue 1.

Schmidt, R. 1983. Interaction, Acculturation, and the Acquisition of Communicative Competence: A Case Study of an Adult. In Wolfson, N., & Judd, E. (Eds.), *Sociolinguistics and Language Acquisition* (pp. 137-74). Newbury House.

Schumann, J. 1978. Second Language Acquisition: The Pidginization Hypothesis. In Hatch, E. (Ed.), *Second Language Acquisition* (pp. 256-71). Newbury House.

Scovel, T. 1988. *A Time to Speak*. Newbury House.

Selinker, L. 1972. Interlanguage. *IRAL*, 10, 209-30.

Selinker, L. 1992. *Rediscovering Interlanguage*. Longman.

Selinker, L., & Lamendella, J. 1978. Fossilization in Interlanguage Learning. In Blatchford. C., & Schachter, J. (Eds.), *On TESOL '78: EFL Policies, Programs, Practices* (pp. 240-49). TESOL.

Selinker, L., & Lamendella, J. 1979. The Role of Extrinsic Feedback in Interlanguage Fossilization: A Discussion of "Rule Fossilization: A Tentative Model." *Language Learning*, 29, 363-75.

Selinker, L., & Lamendella, J. 1981. Updating the Interlanguage Hypothesis. *Studies in Second Language Acquisition*, 3, 201-20.

Selinker, L., Swain, J., & Dumas, G. 1975. The Interlanguage Hypothesis Extended to Children. *Language Learning*, 25, 139-52.

Shapira, R. 1978. The Non-learning of English: Case Study of an Adult. In Hatch, E. (Ed), *Second Language Acquisition* (pp. 246-55). Newbury House.

Snow, M., Met, M., & Genesee, F. 1989. A Conceptual Framework for the Integration of Language and Content in Second / Foreign Language Instruction. *TESOL Quarterly*, 23, 201-17.

VanPatten, B. 1988. How Juries Get Hung: Problems with the Evidence for a Focus on Form in Teaching. *Language Learning*, 38, 243-60.

Vigil, N., & Oller, J. 1976. Rule Fossilization: A Tentative Model. *Language Learning*, 26, 281-95.

Zobl, H. 1980. Developmental and Transfer Errors: Their Common Bases and (Possibly) Differential Effects on Subsequent Learning. *TESOL Quarterly*, 14, 469-79.