Fossilization: five central issues

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Second language acquisition research over the past three decades has generated a wide spectrum of different interpretations of “fossilization” – a construct introduced by Selinker (1972) for characterizing lack of grammatical development in second language learning. These conceptual differences found in the literature, it has become increasingly clear, create confusion rather than offering clarification, thereby obstructing a coherent understanding of the theoretical notion as well as empirical research findings. This article addresses the conceptual differences by raising and discussing five central issues: (1) Is fossilization global or local? (2) Is L2 ultimate attainment isomorphic with fossilization? (3) Is fossilization a product or a process? (4) Is stabilization synonymous with fossilization? (5) Should empirical studies of fossilization span five years or more?

*The ultimate goal of second language acquisition research is to come to an understanding of what is acquired (and what is not acquired) and the mechanisms that bring second language knowledge about. (Gass 1988: 198; emphasis added)*

Introduction

Fossilization – a phenomenon first discussed by Selinker in his 1972 seminal paper – is widely accepted as a key attribute of adult second language acquisition (SLA). More than thirty years of SLA research has generated a wide spectrum of views and findings – showing more divergence than convergence – on the nature of fossilization. In this article, I identify and examine five issues that, in my view, lie at the heart of the increasing lack of uniformity in conception and application of the construct.

In the ensuing sections, I first give a brief description of the background for fossilization research. Then I present a brief overview of definitions of fossilization and of suggested causal variables. Immediately following this, I highlight and discuss several conceptual issues. Next comes a quick sketch of major approaches to empirical studies and a discussion of methodological issues. I conclude by sharing some thoughts on what future research should attend to.
Before I proceed, however, I wish to make it clear that the issues discussed and views expressed here are based on a dual assumption: namely, that second language development is on the whole a dynamic process – meaning it continues to evolve given continuous input, adequate motivation, readiness, and sufficient opportunity to use the language – but that at the same time it exhibits paradoxes such as systematicity and fragmentality; permeability and resistance; variability and premature stability.

**Background**

To begin, let us look at an extract from an obituary of the renowned physicist, Chien-Shiung Wu (1912–1997) published in *The Guardian*, May 13, 1997:

Professor Chien-Shiung Wu, who has died aged 83, was a physicist whose brilliance carried her from obscurity in China during the early thirties to fame in the United States during and after the second world war. As a postdoctoral physicist, speaking idiosyncratic English but with a unique knowledge of gaseous fission products, she was called in by the great Enrico Fermi when, in 1942, an experimental reactor began to run down within weeks of going critical. She quickly and correctly diagnosed poisoning by the rare gas xenon, produced in the fission process.

In 1992, Wu came to Europe for an 80th birthday symposium held in her honor at the international Cern laboratory at Geneva. She was delighted and, with her early difficulties with English still evident, talked about her beta decay work and the importance of choosing critical experiments. It is said that few left the meeting uninspired by her amazing clarity of thought, or unmoved by the power of her quiet yet very special genius. (emphasis added)

Professor Chien-Shiung Wu, who arrived in the U.S. in 1936 at the age of 24 and had since lived and worked there until her death at 83, had 56 years of exposure to English, her second language. She was nevertheless unable to overcome all of her early difficulties with English, despite her undoubted intelligence and her enormous scientific achievements over the intervening decades. Why were some of her early language difficulties insurmountable? Professor Wu’s case is typical of millions of adult L2 learners who, despite long exposure and concerted efforts, become caught up somewhere in the learning process and find themselves unable to progress.

This phenomenon of the non-progression of learning despite continuous exposure to input, adequate motivation to learn, and sufficient opportunity for practice – generally referred to in the literature as “fossilization” – became a central concern for SLA researchers almost as soon as the research field
One of the most enduring and fascinating problems confronting researchers of second language acquisition (SLA) is whether adults can ever acquire native-like competence in a second language (L2), or whether this is an accomplishment reserved for children who start learning at a relatively early age. As a secondary issue, there is the question of whether those rare cases of native-like success reported amongst adult learners are indeed what they seem, and if they are, how it is that such people can be successful when the vast majority are palpably not. (Kellerman 1995: 219)

While Kellerman recognized the difference in ultimate attainment between child first-language acquisition and adult SLA, Towell and Hawkins (1994: 2) further observed:

For most of us the acquisition of second language is less spectacular. If we are past the age of around 7–10 years the acquisition of an L2, in marked contrast to the way we acquired our first language (L1), can turn out to be rather slow, laborious and, even in talented L2 learners, tends to stop short of native-like proficiency. This “stopping short” has been referred to as fossilization (Selinker 1972) or incompleteness (Schachter 1990). It is one of the noticeable characteristics of second language acquisition.

Thus, Towell and Hawkins explicitly linked fossilization to L2 ultimate attainment.

For more than three decades now, the construct of fossilization has been subjected to theoretical and empirical queries under a range of different terms, not only under its by now traditional name of “fossilization” (Selinker 1972; passim the research literature), but also as “plateau” (e.g. Flynn and O’Neill 1988), “fossilized variations” (Schachter 1996), “permanent optionality” (Sorace 1996), “endstate” (Lardiere 1998), and so forth. Underlying the various theoretical and empirical attempts, among other things, are miscellaneous conceptualizations of fossilization. Even a short excursion into the definitions, denotations and explanations that have so far been suggested will allow us to develop a sense of the conceptual disparity.

Definitions

The term “fossilization” was introduced to the field of SLA by Selinker in 1972 on the basis of his observation that the vast majority of second language learners fail to achieve native-speaker competence. Fossilization,
as then conceptualized, implicated both a cognitive mechanism known as the fossilization mechanism (Selinker 1972: 221) and a performance-related structural phenomenon. As a cognitive mechanism, it was thought to be a constituent of a latent psychological structure that dictates a learner’s acquisition of a second language. As a performance-related structural notion, it denoted specifically “the regular reappearance in second-language performance of linguistic phenomena which were thought to be eradicated in the performance of the learner” (1972: 211). The two functions were conceived to be interrelated:

Fossilization [is] a mechanism . . . [that] underlies surface linguistic material which speakers will tend to keep in their IL productive performance, no matter what the age of the learner or the amount of instruction he receives in the TL. (Selinker 1972: 229)

Further, as a performance-based structural notion, fossilization was indirectly, rather than directly, defined in terms of putative fossilizable structures:

[F]ossilizable linguistic phenomena are linguistic items, rules, and sub-systems which speakers of a particular L1 tend to keep in their IL relative to a particular TL, no matter what the age of the learner or amount of explanation and instruction he receives in the TL . . . (Selinker 1972: 215)

This earliest conception suggests several properties of fossilization. First, fossilizable structures are persistent; second, they are resistant to external influences; and third, fossilization affects both child L2 learners and adult L2 learners alike. Behind these, it is important to note, is the implication that L2 learners lack the ability to attain native-like competence. And it is precisely this view that accords the construct of fossilization its intrinsic interest; it is what has drawn the attention of many second language researchers and practitioners.

Since 1972, the notion of fossilization has seen a gradual abstraction and an expansion in its scope. Selinker and Lamendella (1978: 187) explicitly defined it in terms of:

. . . a permanent cessation of IL learning before the learner has attained TL norms at all levels of linguistic structure and in all discourse domains in spite of the learner’s positive ability, opportunity, and motivation to learn and acculturate into target society.

Fossilization, in the view expressed here, is coterminous with permanent cessation of learning, thereby going beyond the “backsliding” of linguistic structures that were thought to be eradicated. The scope of “fossilizable structures” was also extended from “linguistic items, rules and sub-systems” to “all levels of linguistic structure and in all discourse domains”. The role
played by the “learner’s positive ability, opportunity, and motivation” was minimized, thereby suggesting the inevitability of fossilization and thus its innateness.

In Selinker and Lakshmanan (1992), fossilization is defined structurally in terms of persistent non-target-like structures, thereby incorporating long-term persistence as a defining feature of empirical discovering of fossilization.

Fossilization in the sense of a general cessation of learning would, in Selinker’s view, culminate in ultimate fossilized competence (Selinker 1996a,b):

[Fossilization is the process whereby the learner creates a cessation of interlanguage learning, thus stopping the interlanguage from developing, it is hypothesized, in a permanent way . . . The argument is that no adult can hope to ever speak a second language in such a way that s/he is indistinguishable from native speakers of that language. (Selinker 1996b)]

On this view, then, the ultimate attainment of adult L2 acquisition is a fossilized interlanguage; fossilization is inevitable; and no adult L2 learner would ever be able to pass for native in all contexts.

Thus, since 1972, Selinker has broadened the referential scope of fossilization: from “backsliding” to “cessation of learning” and to “ultimate attainment”, gradually moving away from the 5% estimate that he made initially concerning the hypothesized size of the successful SLA population to the claim that no adult L2 learner can hope to achieve native-like competence in all discourse domains. Accompanying this change in conception is also an expansion of the linguistic scope of fossilization, from fossilizable structures (i.e. local fossilization) to a fossilized interlanguage (i.e. global fossilization). Meanwhile, the dual functions of fossilization, namely, its being both a cognitive mechanism and a structural–behavioral phenomenon, which were explicit in the earliest postulation, tend to be less clear-cut in his later definitions.

Beyond Selinker’s definitions, the SLA literature over the past three decades has seen a good variety of conceptions of fossilization. Many are in essence extended interpretations of the notion as originally proposed by Selinker in 1972. Lowther (1983: 127), for example, has the following interpretation of fossilization: “Fossilization, as presented in much of the literature, is understood to be the inability of a person to attain nativelike ability in the target language” (emphasis added). This is reminiscent of Selinker’s view of fossilization as fundamentally a cognitive mechanism.

Most SLA researchers, however, have followed and built on the performance dimension of Selinker’s (1972) dual definition. Ellis (1985: 48), for instance, offers the view below:

Fossilized structures can be realized as errors or as correct target language forms. If, when fossilization occurs, the learner has reached a stage of
development in which feature $x$ in his interlanguage has assumed the same form as in the target language, then fossilization of the correct form will occur. If, however, the learner has reached a stage in which feature $y$ still does not have the same form as the target language, the fossilization will manifest itself as error.

The origin of this view that there are fossilized errors as well as fossilized target-like forms can be traced back to Vigil and Oller (1976: 282):

[W]e will extend the notion of fossilization to any case where grammatical rules, construed in the broadest sense, become relatively permanently incorporated into a psychologically real grammar.

... An adequate explanation must account for the incorporation of rules into developing grammars in relatively permanent form regardless of whether those rules conform or do not conform to the norms of the language which is being learned. It is not only the fossilization of so-called ‘errors’ that must be explained, but also the fossilization of correct forms that conform to the target language norms.

However, this opinion is not widely endorsed. Most researchers, instead, are of the view that the term ‘fossilization’ should be reserved exclusively for non-target-like forms. Hyltenstam (1988: 68), for example, gives the following definition of fossilization:

Fossilization – according to observations – is a process that may occur in the second language acquisition context as opposed to first language acquisition. It covers features of the second language learner’s interlanguage that deviate from the native speaker norm and are not developing any further, or deviant features which – although seemingly left behind – re-emerge in the learner’s speech under certain conditions. Thus, the learner has stopped learning or has reverted to earlier stages of acquisition.

Here, fossilization – in line with Selinker’s (1972) view – is associated with deviant forms, and ‘backsliding’ is identified as the prime phenomenological manifestation of fossilization. A similar conception has been entertained by many others, including Preston, who identifies fossilization with the “persistence of an incorrect form in the emerging interlanguage” (1989: 245).

While fossilization has so far been largely construed as an IL product, some researchers see it as a process – “a process whereby repeated practice and exposure to the language does not lead to any further development” (Sharwood Smith 1994: 37).

Further, there is also the conception that fossilization is a stage in the interlanguage process. Bley-Vroman (1989: 47–9), for example, asserts:
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. Development ceases, and even serious conscious efforts to change are often fruitless. Brief changes are sometimes observed, but they do not ‘take’. The learner backslides to the stable state.

Fossilization is thus taken to be “permanent stabilization”, and as such, an ultimate stage in the interlanguage process. Corroborating this view, Tarone (1994: 1715) points out: “A central characteristic of any interlanguage is that it fossilizes – that is, it ceases to develop at some point short of full identity with the target language.” Tarone’s claim is worth noting for its strong implication that fossilization is inevitable, and that it is what characterizes the ultimate attainment of every learner.

Summing up: fossilization – in the eyes of many – is a product as well as a process; it affects the entire IL system as well as its sub-systems; it is literally permanent as well as relatively permanent; it is persistent and resistant; for some researchers it happens to every learner and for others to only some learners (for a detailed discussion of these positions, see Han 1998). It is a stage of interlanguage learning, therefore incorporating the fossilization of correct as well as of incorrect forms (e.g. R. Ellis 1985; Vigil and Oller 1976). It is externally manifested as well as internally determined. Furthermore, it is suggested that fossilization may represent the ultimate outcome of L2 learning (e.g. Tarone 1994).

**Putative causal variables**

Over the years, the lack of uniformity in the understanding of the notion of fossilization has led researchers to apply the term to a wide range of phenomena, including but not limited to the ones below:

- backsliding (e.g. R. Ellis 1985; Schachter 1988; Selinker 1972)
- stabilized errors (e.g. Schumann 1978)
- learning plateau (e.g. Flynn and O’Neil 1988)
- typical error (e.g. Kellerman 1989)
- persistent non-target-like performance (e.g. Mukattash 1986)
- low proficiency (e.g. Thep-Ackrapong 1990)
- de-acceleration of the learning process (e.g. Washburn 1991)
- ingrained errors (Valette 1991)
- systematic use of erroneous forms (Allwright and Bailey 1991)
- errors made by advanced learners (e.g. Selinker and Mascia 1999)
- variable outcomes (Perdue 1993)
- cessation of learning (e.g. Odlin 1993)
- structural persistence (e.g. Schouten 1996)
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- errors that are impervious to negative evidence (Lin and Hedgcock 1996)
- random use of grammatical and ungrammatical structures (Schachter 1996)
- ultimate attainment (passim the SLA literature)
- long-lasting free variation (R. Ellis 1999)
- persistent difficulty (Hawkins 2000)
- inability to fully master target language features (passim the SLA literature).

These denotations have, in turn, spawned a myriad of explanations. In the SLA literature, explicit and implicit explanations of fossilization abound. Some of them are based on empirical studies ostensibly devoted to the subject matter of fossilization, and some are sheer speculations without any empirical basis. The suggested causal variables include but are not limited to:

- lack of instruction (e.g. Krashen and Seliger 1975, 1976; Schmidt 1983)
- absence of corrective feedback (e.g. Higgs and Clifford 1982; Lightbown and Spada 1999; Tomasello and Herron 1988; Vigil and Oller 1976; Valette 1991)
- satisfaction of communicative needs (e.g. Corder 1978, 1983; R. Ellis 1985; Klein 1986; Klein and Perdue 1993; Kowal and Swain 1997; Selinker and Lamendella 1978; Wong-Fillmore 2002)
- age (passim the SLA literature)
- lack of written input (e.g. Schmidt 1983; VanPatten 1988)
- false automatization (Hulstijn 1989, 2002a)
- end of sensitivity to language data (Schnitzer 1993)
- lack of access to UG learning principles (White 1996)
- learning inhibits learning (Elman et al. 1996)
- language transfer (e.g. Han 2000; Jain 1974; Kellerman 1989; Major 2002; Selinker and Lakshmanan 1992).

For a comprehensive list and discussion of the suggested causal variables, see Han (2003a, 2004).

In brief, over the years, the term fossilization has come to be associated with a wide range of variables, exhibiting divergent interpretations of the construct. The lack of uniformity in the conceptualization and application of the notion, while creating confusion, points to, among other things, the fact that fossilization is no longer a monolithic concept as it was in its initial postulation, but rather a complex construct intricately tied up with varied manifestations of failure.

The proliferation of uses of the term fossilization is matched by the rich spectrum of explanatory accounts, with almost every existing perspective on SLA represented (e.g. the cognitive, the neural, the environmental, and the socio-affective). Just as each idiosyncratic application of the term potentially adds a new empirical property to fossilization, each explanatory account reveals a potential causal variable, and together they weave a large and intricate picture of fossilization.

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It is important to note that the various theoretical and empirical attempts made over the years have resulted more in conceptual diversity than uniformity, though all recognize fossilization as a central characteristic of SLA. The differences seem to center around four issues: (1) whether fossilization is global or local; (2) whether L2 ultimate attainment is isomorphic with fossilization; and (3) whether fossilization is a product or a process, and (4) whether stabilization and fossilization are synonymous. We will now look at each in turn.

**Issue 1: Is fossilization global or local?**

Some researchers have viewed fossilization as occurring globally to the entire interlanguage system; others have maintained that fossilization could only happen locally in parts of the subdomains of the interlanguage system. It may be recalled that Selinker himself has shifted his perception from local to global. Mirroring this difference, the SLA literature sees the use of “fossilized error”, on the one hand, suggesting local fossilization, but “fossilized competence” and “fossilized learner”, on the other hand, suggesting global fossilization. As an illustration, Tarone, Frauenfelder and Selinker (1976; see also Selinker 1992) argue that two types of learners can be distinguished: fossilized learners (referred to as “Type 1 learners”) and non-fossilized learners (referred to as “Type 2 learners”). According to the researchers, a Type 1 learner’s interlanguage is characterized by cessation of learning or stability due to his or her inability to change the IL system. In contrast, a Type 2 learner’s interlanguage is dynamic in that it changes over time, thereby suggesting continuation of learning. Apparently, such a bifurcation of L2 learners is conceptually flawed. For one thing, it essentially relies only on learners’ production (i.e. the observable behavior) to determine whether learning is occurring or not, and inasmuch as it ignores the underlying internal, invisible, and cognitive processes, it reflects an oversimplistic and a behavioristic view of learning.

As of yet, it is crucial to note, evidence of global fossilization remains entirely impressionistic. More precisely, global fossilization is assumed rather than established. The preponderance of the available empirical evidence points instead to local fossilization (Han 2003a,b, 2004); that is, fossilization only hits certain linguistic features in certain subsystems of the interlanguage of individual learners, while other linguistic features in the same subsystems are successfully acquired or continue to evolve.

**Issue 2: Is L2 ultimate attainment isomorphic with fossilization?**

One major confusion that arises in the current SLA literature concerns the fact that the term fossilization is sometimes adopted from a cross-learner
perspective to refer to L2 ultimate attainment, and at other times from a within-learner perspective, in which case it is tied to local cessation of learning pertinent to individual learners’ interlanguage (e.g. stabilized errors). Also closely linked to this confusion is the term ultimate attainment, whose nature in the context of L2 has never been clarified beyond its literal meaning of “end state” or “terminal state”. Birdsong (1999: 10), for example, defines it as “the end state or asymptote of L2A, however close to or far from nativelike that state may be”. A close reading of the SLA literature, however, shows that there are at least two general facets to L2 ultimate attainment: (a) general failure (Bley-Vroman 1989); and (b) differential success and failure. We will look at each in turn.

General failure

Despite the lack of large-scale and comprehensive studies able to demonstrate the phenomenon scientifically, an impressionistic look at learners in different acquisition contexts produces prima facie evidence that the “majority of adult learners wind up far from the target”, and that “their interlanguage remains distinct from the mature L2 in a good number of ways” (Eubank’s 1997 SLART-L on-line communication).

Success in this context, in the view of some researchers, means complete mastery of a second language, namely, the attaining of “all levels of linguistic structure and in all discourse domains” (Selinker and Lamendella 1978: 373; see also Sharwood Smith’s 1997 SLART-L on-line communication). The general lack of such success is characteristically seen to reside in the imbalance between the rate of success and the rate of failure. Over the years, the 5% success rate proposed by Selinker (1972) has been widely quoted. Some argue that this figure is too conservative (Birdsong 1999, 2004; Seliger, Krashen and Ladefoged 1975), while others claim that even 5% is a gross overestimate (Long 1990; Gregg 1996). If we follow Gregg’s (1996: 52) speculative argument that “truly native-like competence in an L2 is never attained”, there can be no question of any imbalance since no learner would ever achieve perfect mastery of an L2 (cf. Sorace 1993). Still other researchers (e.g. Kellerman 1995) who quote the 5% figure do so merely as a general recognition of the fact that there is overwhelmingly more failure than success in adult L2 acquisition.

In the SLA literature, it is also worth noting, there exist different views on what success should entail. As mentioned, for some, success means complete mastery of every facet of the L2; for others (e.g. Schachter 1996), however, it means achieving only native-like competence in the core grammar of L2 without taking account of linguistic peripherals. Despite the lack of consensus, the point nevertheless remains that in whichever sense, complete success is not achievable in post-adolescent L2 acquisition. This claim has gained considerable support from studies of ultimate attainment in so-called
“near-natives” (e.g. Coppieters 1987; Sorace 1993). Although they each focused only on a small number of linguistic subsystems, Coppieters (1987) and Sorace (1993) both present convincing evidence of the existence of a significant gap, assumed to be permanent, between the interlanguage grammar and the mature native grammar.

Counterevidence, to a lesser extent, is also available (Birdsong 1992; Bongaerts 1999; Ioup et al. 1994; White and Genesee 1996). White and Genesee (1996), for instance, come to the conclusion that it is possible for adult L2 learners to acquire native-like competence. Birdsong (1992), on the other hand, offers mixed evidence from his subjects showing that with some subsystems complete mastery is possible, whereas with other sub-systems it is not. Findings such as this speak to the necessity of a non-monolithic view on ultimate attainment. And this takes us to the second facet of L2 ultimate attainment: differential success and failure.

Differential success/failure

In addition to general failure, L2 ultimate attainment features differential success. Among others, Bley-Vroman (1989: 49) points out a great range of individual variations:

[F]ew adults are completely successful; many fail miserably, and many achieve a very high level of proficiency, given enough time, input, effort and given the right attitude, motivation and learning environment. Others come between the two extremes.

In writing on the longitudinal studies of the ESF project, Perdue (1993: 8) particularly mentions the following as a salient feature of the untutored L2 learners:

. . . they achieve very different degrees of language mastery. Few, it seems, achieve native-like proficiency. Some stop (or, to use Selinker’s 1972, term, ‘fossilize’) at a very elementary level. Others come between the two extremes.

Similarly, Hyltenstam and Abrahamsson (2001: 164) note:

The ultimate attainment of individual L2 learners varies enormously in its approximation to nativelike proficiency, although some individuals may reach very high levels of proficiency and in some cases even pass as native speakers.

All these researchers, adopting a cross-learner view, stress qualitative individual variations in attaining competence in an L2, and that learners, instead of
arriving at an identical terminal state of interlanguage competence that is short of the target, may end up with differential terminal interlanguage states in which they have successfully covered varying distances towards that target.\textsuperscript{12}

The issue of differential success is not limited to a cross-learner view, however. If we look at the interlanguage of a particular learner, we can also see differential success. Bialystok notes, for instance, that “for a particular individual, some aspects of language learning are mastered more easily than are others” (1978: 69). In fossilization terms, Selinker and Lamendella (1978) claim that for a given learner, part of his interlanguage system fossilizes and part of it does not. The existence of such kinds of intra-learner variation is suggestive of differential ultimate attainments within an individual learner’s system (cf. Sorace 1993), with some subsystems successfully reaching the target and others falling short of it (Lardiere 1998).

Thus, L2 ultimate attainment has at least three facets: (a) cross-learner general failure; (b) inter-learner differential success/failure; and (c) intra-learner differential success/failure. All are arguably manifestations of fossilization in that they all involve permanently arrested development of some sort (cf. Selinker and Lamendella 1978).\textsuperscript{13} Importantly, the three facets are inter-related: general failure is a conglomeration of inter-learner and, further, intra-learner failures.

Following from this line of thinking, using the term \textit{fossilization} to explain away ultimate attainment (e.g. Selinker 1972) does not promise any research potential, nor would it lead us anywhere closer to an enhanced understanding of SLA.\textsuperscript{14} However, viewing fossilization as \textit{partially} characterizing ultimate attainment may prove to be useful, as it calls for research attempts to address fundamental SLA issues, namely: What leads to general failure? What leads to differential failure across learners? And what leads to differential failure within an individual learner?

Given the multiple angles of fossilization, any effort to explain the phenomenon through one unitary account would prove inadequate. Consider, for example, biological maturational constraints as a causal factor. While it may explain away the general failure of the overwhelming majority of adult L2 learners to reach native-speaker (NS) competence in an L2, it is incapable of accounting for inter-learner as well as intra-learner differential success and failure in L2 learning (cf. Pulvermüller and Schumann 1994). Hence, the biological account cannot serve as a universal ontological account of fossilization (cf. Birdsong 1999; Scovel 2000). A more elaborate account of the relationship between ultimate attainment and fossilization can be found in Han (2003b, 2004).

\textbf{Issue 3: Is fossilization a product or a process?}

L2 researchers differ also in their view on whether fossilization is a process or a product. Apparently, some think it is a process, not a product; others
think just the opposite, and still others think it is both. Importantly, underlying these three positions are three different perspectives. That is, the first has adopted a cognitive perspective on fossilization, the second a phenomenological perspective, and the third a combination of the two.

Viewed from a phenomenological perspective, fossilization is a product, and as such it should, according to some of the definitions, manifest itself as permanently stabilized linguistic deviance. The word “permanent” is elusive, though: should we take it inferentially or literally? A literal interpretation would necessarily predict that the fossilization will never be proven. Interestingly, some have indeed taken the literal meaning, and in so doing, they are going down such a garden path:

To make any decisive claims [on fossilization], . . . it would be necessary to demonstrate that the fossilized item in question has completely ceased developing towards the L2 norm. However, this would require the researcher analyzing the learner’s performance over a sufficient length of time, ideally from the moment of observation of a fossilized item until the learner’s death, to be sure that no destabilization had occurred. (Jung 2002: 16)

This kind of suggestion, though oversimplistic at best, nevertheless hints at the difficulty in documenting fossilization. Indeed, under a phenomenological approach, as the case above apparently is, it would be empirically impossible to establish fossilization as a product. However, the absence of such evidence should not be taken as evidence of absence of fossilization. The question is: how do we approach it? Given the methodological difficulty, it would seem necessary (and plausible) to conceptualize fossilization as a process, a process whereby learning ceases in spite of “repeated practice and exposure to the [target] language” (Sharwood Smith 1994: 37). However, one could still argue upfront that learning can stop for various reasons, hence the question: how do we know which kind of cessation of learning is indicative of fossilization? This takes us to the next issue.

**Issue 4: Is stabilization synonymous with fossilization?**

Cessation of learning has also been referred to in the SLA literature as premature stabilization (Long 2003). One recurrent issue in studies of fossilization is how closely unobserved invisible fossilization should be tied with observed stabilization of interlanguage forms over time. Many questions can be raised here, but the central ones seem to be: Are the two terms to be defined differently or are they synonymous? If synonymous, why would there be a need for the term ‘fossilization’ when we already had the term ‘stabilization’? Han (1998), and later Selinker and Han (2001), provide detailed discussions of these and related issues. In essence, they suggest that
stabilization and fossilization can form a continuum, but that the former should not simply be equated with the latter, given that they discern at least three possible cases of stabilization:

1) a temporary stage of “getting stuck”
2) interlanguage restructuring; and
3) long-term cessation of interlanguage development.

Case 1, here illustrated by short-term stabilization of interlanguage forms, is a natural phase in all learning, and it is often discussed with other processes such as transfer, whenever the cognitive relationship of second language learning to other types of learning is discussed. Case 2 is superficial; that is, restructuring of interlanguage knowledge produces a surface appearance of stabilization of certain interlanguage features. An example would be the ‘U-shaped’ learning curve (Karmiloff-Smith 1986; Kellerman 1984; Towell and Hawkins 1994), where learning can take a deep dive and stabilize there for a while before surging up, in which case the stabilization is not associated with discontinuation but rather with progress (i.e. implicit restructuring of existing knowledge).

In Case 3, stabilization becomes the harbinger of fossilization. Thus, only in the third case, shown by long-term stabilization of interlanguage forms, “does the issue of fossilization indistinguishable from stabilization arise” (Selinker and Han, 2001: 282), in which stabilization becomes part of the fossilization process, with fossilization as the ultimate outcome. Acceptance of this view has important methodological implications (as will be discussed below), leading in particular to the view that only longitudinal studies of the same L2 learners, over years, can truly show ‘fossilization’.

When stabilization constitutes a prelude to fossilization (Han 1998; Selinker and Han 2001), it is likely to exhibit one of the following four behaviors: non-variant appearance (i.e. stabilized interlanguage forms manifest themselves invariantly over time), backsliding (i.e. variable reappearance over time of interlanguage features that were thought to have been eradicated), stabilized inter-contextual variation (i.e. context-based variable appearance over time of interlanguage target-like and/or various non-target-like features) and stabilized intra-contextual variation (i.e. variable appearance over time of interlanguage target-like and/or non-target-like features in the same context)\(^{15}\) (cf. Table 1). Importantly, all of these manifestations are predicated upon the conditions of sustained exposure to input, adequate motivation to learn and sufficient opportunity for practice. That is, without, say, “massive positive evidence” (as it is sometimes called), it is argued here that it makes no sense to talk about the underlying processes of fossilization.

Given the intricate relationship that has been postulated between stabilization and fossilization as described above, and that one (stabilization) is observable and the other (fossilization) is inferred, it only stands to reason to agree with other researchers (e.g. Sharwood Smith 1994) and conceptualize...
fossilization as an underlying process. It further follows that fossilization should be operationalized in terms of long-term stabilization which is impermeable to any external influences and irrespective of input, motivation and opportunity for practice.

Once again, it must be noted that there is far from unanimity here. The view that stabilization, rather than fossilization itself, should constitute the relevant domain of inquiry for empirical studies of long-term non-learning of an L2 is strongly articulated in the interesting recent critical review by Long (2003), where several interesting claims are advanced. These are primarily: (1) stabilization is the first sign of (for him, putative) fossilization; (2) the difference between stabilization and fossilization is permanence; and (3) stabilization and fluctuation are mutually exclusive. These assumptions subsequently lead to the conclusion that “understanding the causes of stabilization (and destabilization) would seem to promise as much for SLA theory as work on fossilization” (p. 490; emphasis in original).

There appears to be an equation drawn between stabilization and fossilization underlying Long’s view which, it is argued here, may not be sufficiently sound, either theoretically or empirically. Theoretically, it risks conflating learning plateau – a natural learning process – with permanent cessation of learning. As Long himself has noted (2003: 490), “. . . the two (stabilization and fossilization) processes might share the same surface characteristics, but may differ in their underlying causes”. On an empirical level, the equation seemingly aids in operationalizing fossilization. However, it potentially compounds empirical research by its advocation of having to include every instance of stabilization in understanding fossilization, which results in the casting of an unnecessarily wide net. Also, the apparent setting up of stabilization and fluctuation as mutually exclusive appears to obviate a by now well-established fact about interlanguage development, namely that interlanguage varies and that these interlanguage variations may themselves stabilize (see Tarone, Frauenfelder and Selinker 1978 for an early discussion). Additionally, this variation may itself happen at both the invisible competence and empirical performance levels as argued by Sorace (1996), where she distinguishes, importantly for the present purposes, between

<table>
<thead>
<tr>
<th></th>
<th>Types</th>
<th>Tokens</th>
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<tr>
<td></td>
<td>a) non-variant appearance</td>
<td>X X X X X</td>
</tr>
<tr>
<td></td>
<td>b) backsliding</td>
<td>X Y Y X X</td>
</tr>
<tr>
<td></td>
<td>c) stabilized inter- and intra-contextual variation</td>
<td>XY XY XY XY</td>
</tr>
</tbody>
</table>

"X" stands for a non-target-like feature. "Y" stands for its target-like counterpart.

Table 1. Three potential manifestations of fossilization.
surface variation and underlying “permanent optionality”. (One should also note in this regard Johnson et al. (1996) on “permanent indeterminate knowledge”, and R. Ellis (1999) on “long-lasting free variation”.)

Thus, there is an inherent complexity surrounding stabilization and fossilization which seems to have been minimized in Long’s arguments. The working assumption advocated here is that, until there is clear evidence to the contrary, we should continue to follow the traditional course and conceptually keep stabilization and fossilization apart as, broadly, two different though related theoretical and empirical entities. Following on from this assumption, it is necessary to selectively investigate stabilization as part of the fossilization process. If Han (1998) and Selinker and Han (2001) are right about distinguishing between different cases of stabilization, as Long does not do, then it should be only Case 3 (i.e. long-term stabilization being a prelude to fossilization) that becomes the focus of fossilization research.

**Major empirical approaches**

The abundance of argumentation at the theoretical level is counter-balanced by a marked lack of interest in carrying out empirical studies, particularly longitudinal studies (Perdue 1993). Over the years, researchers who did attempt empirical investigations of fossilization have generally adopted either a *product perspective* or a *process perspective* (see Issue 3 above). In the product perspective, fossilization has been assumed, and the subjects labeled from the outset “fossilized”, with the subsequent research effort being to confirm fossilization in such learners. Usually this is done through a “defossilization attempt”: if the attempt is unsuccessful, it is thought to provide evidence that the subjects are indeed fossilized. A process perspective, on the other hand, usually relies on a longitudinal, or sometimes pseudo-longitudinal, study for establishing what is fossilizable.

On the whole, researchers have looked to *persistence* and *resistance* as major indicators of fossilization, even though there is a lack of agreement on what “persistent” and “resistant” actually mean. They, consequently, set out to look for different symptoms. Some have sought stabilized deviant interlanguage forms, others have looked for typical errors across learners with the same L1, and still others have collected the remaining errors in the interlanguage of the advanced learners in the belief that what remained should be the most persistent and were therefore the most likely candidates for fossilization.

Empirical studies to date typically have adopted one, or a combination of more than one, of the following methodological approaches: (1) longitudinal; (2) typical-error; (3) advanced-learner; (4) corrective-feedback; and (5) length-of-residence (LOR). A brief discussion of each follows.16

An example of a typical error approach can be found in Kellerman (1989). To demonstrate that a typical error is an indicator of fossilization, the study
invoked pseudo-longitudinal evidence from learners at different proficiency levels. While a typical error does indeed show the pervasiveness of an interlanguage structure within a particular interlanguage learning community, this way of demonstrating fossilization has a drawback as far as the use of pseudo-longitudinal evidence is concerned. Because the pseudo-longitudinal evidence is cross-sectional, it can only produce a general picture, not a specific one, of what is going on in each individual’s interlanguage. It therefore either reduces the credibility of the typical error as an indicator of fossilization in every L2 learner’s interlanguage, or falsely implies that the typical error would fossilize in every learner within the same interlanguage community. Insofar as evidence can be found of L2 learners in that community who show no sign of the typical error, it would significantly weaken the researcher’s general claim that the error is overall fossilizable. Fossilization has been understood to be largely an idiosyncratic process (Nakuma 1998; Selinker 1992; Selinker and Lamendella 1978). In other words, what fossilizes in one learner’s interlanguage may not fossilize in that of another learner. In a nutshell, the use of pseudo-longitudinal evidence seemed effective in revealing the genesis of the interlanguage construction but was weak in revealing individuality.

Some researchers (e.g. Hyltenstam 1988) turned to advanced learners or near-native speakers for evidence of fossilization. Their rationale was that whatever remained in the interlanguage of this group had been subject to long-term stabilization and changed least (see also Selinker and Lakshmanan 1992). This kind of reasoning, however, leaves itself open to two sorts of questions: (a) If these advanced learners have succeeded in moving so close to the target language, why is it not possible for them to move even closer? (b) In the absence of longitudinal evidence, how sure are we that the deviant features are products of long-term stabilization rather than of recent restructuring?

Other researchers used corrective feedback as a diagnostic of fossilization (e.g. Thep-Ackrapong 1990; see also Lin 1995; Lin and Hedgcock 1996). Implicit in these studies is the assumption that corrective feedback is a unidimensional, rather than a multi-dimensional, interactive process as it should be considered. Consequently, it is always the learner’s performance following the corrective feedback, not the nature of the corrective feedback itself, that is subject to scrutiny. This can be problematic because in the feedback process, a number of factors such as the explicitness, timing and the learner’s interpretation may interact to determine its effect (for recent studies of learners’ responses to corrective feedback, see Han 2001; Mackey, Gass and McDonough 2000; Roberts 1995). It follows that if L2 learners do not respond to corrective feedback in the way the teacher/researcher desires, it is possible that the feedback provided is not appropriate.

Researchers have also resorted to length of residence (LOR) as a criterion for identifying “fossilized learners” (e.g. Thep-Ackrapong 1990; Washburn 1991). It is worth noting that recent SLA research has seen increased use of
LOR in conjunction with age of arrival (AOA) to index L2 ultimate attainment and age effects in SLA (for the most recent collection of studies, see Birdsong 1999). Both LOR and AOA have a limited scope of application, however, as they confine research to subjects who reside in the target-language environment. Moreover, research based on LOR raises a fundamental question: in the absence of longitudinal evidence, how can we be sure that an interlanguage form has stabilized or not? LOR presupposes knowledge of the time it generally takes for acquiring an L2, and we know for sure that this knowledge does not yet exist with regard to L2 acquisition. On this, I concur with Klein (1993: 115) that “duration of stay is an uninteresting variable”, and that “what matters is the intensity, not the length of interaction”.

Given, as indicated above, that none of the methods developed so far can stand alone as an independent and reliable source of evidence of fossilization, it seems mandatory that any empirical research be preceded by a careful consideration of a variety of factors, some of which have been discussed or touched upon above, and others of which have yet to be explored. Moreover, longitudinal studies are necessary for establishing long-term stabilization (cf. Selinker and Han 2001; for recent attempts, see Han 1998; Lardiere 1998, 2000; Long 2003). As Larsen-Freeman (1997: 159) aptly puts it, “we need a camcorder, not a camera to do our research”. In addition, following Long’s suggestion, analyses of longitudinal data should be conducted at the level of types as well as of tokens so as not to “miss changes in form–function relationships over time, zig-zag developmental curves, and U-shaped behavior” (Long 2003: 499).

Issue 5: Should a longitudinal study last 5 years or longer?

In fossilization research, an issue of persistent concern is the time span of a longitudinal study. In other words, how long would be sufficient for determining that stabilization is functioning as a prelude to fossilization? A number of researchers (e.g. Selinker 1985; Long 1997) have advocated a non-differentiated, arbitrary criterion of five years, in keeping with the aforementioned popular assumption that 5 years of LOR in a target language environment provides an index of what an L2 learner is (or is not) capable of acquiring. This criterion, as argued above, is rather vacuous. The issue of time is perhaps far more complex than has been generally understood.

A useful point of departure for discussing this issue can be found in a statement made by Larsen-Freeman (1997: 152):

While interlanguages of speakers of various first languages learning English as a foreign language have much in common, they also are distinctive, each constrained by the strange attractors of their L1s, which may be greater than the force of the strange attractor of English. Thus, the English pronunciation of a native speaker of Spanish will differ from
that of a native speaker of Chinese. Many other fundamental differences mark the challenges present for learners from one native language background as for another. Besides the obvious linguistically-based differences are the learner’s cultural backgrounds and reasons for learning (not learning) a second or foreign language in the first place.

What is captured more than anything else in this quote is a two-fold observation that has been continuously receiving attention from SLA researchers (see e.g. Andersen 1983; Bialystok and Miller 1999; DeKeyser 2000; Gass and Selinker 2001; Hawkins 2000; Henkes 1974; Kellerman 1984; Schachter 1974, 1988, 1996; Schumann 1979; Sharwood Smith 1991, 1994; Sorace 1996; Zobl 1982), namely (a) that the same target L2 may present differential challenges to individual learners from different L1 backgrounds, and (b) that features within the same target language may present differential challenges to individual learners. As Hulstijn (2002b) notes, “not all language phenomena are equal in terms of how they are processed and acquired”. Given this, the time it takes to acquire the same target language may vary from individual to individual, and, by the same token, the time needed by an individual may vary for the acquisition of different features of the target language. (For a review of empirical evidence, see e.g. Kellerman 1984.)

What determines how much time is needed for an individual to acquire a particular feature of the target language? As Larsen-Freeman has suggested, the “linguistically-based differences” between the L1 and the L2 is a primary factor. Additional factors are “learners’ cultural backgrounds” and “reasons for learning (or not learning)”. To this list one could easily add a few more: quality and quantity of exposure to the target language, mode of learning, opportunity to use the target language, learners’ readiness, learners’ processing strategies, input characteristics, and last but not least, the inherent complexity – formal and functional – of a given feature of the target language. These factors, along with a multitude of others (many of which are perhaps not yet known), may interact to co-determine the time needed for acquisition to be complete. How, then, would this consideration tie into the time span for a longitudinal study of fossilization?

If the above reasoning were on the right track, it would imply that positing an overarching time span for longitudinal studies of fossilization would be false and misleading, but that the time span should vary depending on which TL feature is under investigation. In principle, all other things being equal, the time required for determining if an interlanguage feature has stabilized (leading to potential fossilization) should, at the very least, be comparable to the time that an average learner under optimal learning conditions would take to acquire the relevant TL feature. To illustrate, let us hypothetically assume that an average learner, X, took three years to acquire the English passive construction. To ascertain the “stabilization → fossilization” status of this construction in the interlanguage of another learner, Y, at least three years of observation, ceteris paribus, would be
necessary. By the same token, if an average learner, X, took twenty years to acquire English verbs of causative alternation (e.g. \textit{break} [vt] / \textit{break} [vi]), a longitudinal study of comparable length is warranted to establish the “stabilization $\rightarrow$ fossilization” status in the interlanguage of learner Y. The bottom line is that sufficient time should be allowed for the subjects to learn and display learning.

A concrete example should suffice to clarify the point: R. Ellis undertook a two-year longitudinal study of two child L2 learners’ use of requests in an ESL classroom setting, the aim being to understand “how and to what extent interaction in the classroom shapes the process of L2 acquisition” (1994: 1). The two subjects, J and R, aged 10 and 11 years, were almost complete beginners in English. Data collected were primarily comprised of paper-and-pencil records of their utterances while the subjects were engaged in various types of interaction in the classroom. A multi-level analysis (e.g. formal complexity, level of directness, perspective, etc.) indicates, \textit{inter alia}, that J and R progressed noticeably on a number of fronts, including producing fewer instances of verbless requests (e.g. “big circle” when requesting a cut-out of a large circle), having systematically extended the range of request types, and so forth. Yet they appeared to have failed to progress on others. For instance, during the two-year period, a preponderance of their requests were characterized by direct and simple directives; and the range of formal devices employed remained highly limited. In brief, a number of deficiencies seemed to have stabilized. Now, can we consider them fossilized? Certainly not, for both subjects were beginners, and as R. Ellis pointed out (1994: 20), the features noted above are “late-acquired”, and hence “the developmental process was not complete”. Thus in this case, although two years of longitudinal data have produced instances of stabilization, they are insufficient to establish any fossilization due to the fact that the target features would require a longer time to be assimilated.

Clearly, the implementation of the sort of case-by-case suggestion given above would hinge on the availability of reliable temporal indexes for L2 acquisition, which, hopefully, future research will provide. Until then, researchers would need to extrapolate the information from the existing literature. Moreover, the case-by-case suggestion implies that research efforts should concentrate on identifying local fossilization, not global fossilization.

Some concluding thoughts

The present state of fossilization research is still characterized by a plurality of unresolved issues. A major issue is whether or not a field-wide definition is possible. With the great strides made in SLA research over the past three decades, fossilization is no longer a monolithic concept but rather one tied up with different manifestations of failure in L2 learning. Research attempts to
examine failure seem to be occurring on both a macroscopic and a microscopic level. On the macroscopic level, researchers (e.g. those who study critical period effects in SLA) typically look at general failure across adult L2 learners. On the microscopic level, on the other hand, they look at individual learners and focus on the local cessation of learning that takes place in various interlanguage subsystems such as phonology, morphology, syntax, lexicon and pragmatics. Given the emergence of the two mainstream perspectives on fossilization, it becomes essential that researchers make it clear what they understand by fossilization.

An examination of the L2 literature points to the necessity that when defining fossilization, in whatever terms one likes, two components should always be focused on: (a) the tendency towards cessation of learning (b) despite continuous exposure to input, adequate motivation and readiness to learn, and sufficient opportunity for practice. Incorporating them in any definition of fossilization could have some immediate yet profound benefits. First of all, it would enforce a more rigorous use of the term on both the macroscopic and microscopic levels, thereby uniting, rather than dividing, research efforts launched from different perspectives. Second, it would help channel research attention, which is, currently, thinly spread over a wide range of variables, onto those that are most revealing about the mechanisms of L2 acquisition. And third, it would significantly facilitate the comparison of research findings across the board.

Closely associated with the need for a clear definition of fossilization is also the need for identifying and defining the target language. SLA studies to date have, in general, ignored the latter. In fossilization research, which is essentially target-language referenced, identifying and defining the target language takes on particular importance, given the existence e.g. of multiple varieties of English. Concerted efforts should be made at the outset of research to determine the nature of the social and linguistic environment within which learners have developed their L2. Care should be taken to ensure that the target language against which the interlanguage is examined is indeed what the subjects have been exposed to. In addition, external and internal perspectives (i.e. a researcher perspective and a learner perspective) might both be necessary to ensure that what researchers determine to be the norm is indeed the norm pursued by the subjects.

Aside from the definitional issues, there are also outstanding methodological issues. For example, most of the empirical studies to date are non-longitudinal. Fossilization is therefore largely assumed rather than established through longitudinal observation. What is even more problematic is that the assumption is often made on the basis of criteria that lack principled motivation. As mentioned, there is a suggestion that five years of residence in the TL environment be used as an index of ultimate attainment. This flatly fails on logical grounds. First, it is highly unlikely that learning will not continue after five years, given continuous exposure to input and adequate motivation to learn. Second, five years of residence is not necessarily positively
correlated with the quantity of exposure to the TL. Even in a TL environment, as many have noted, there are communities or individuals whose contact with the target language is minimal.

In essence, time cannot be counted on as a reliable source of information on the environmental conditions for L2 learning. What needs documenting is both the type of interactions that learners have in the L2 environment and their intensity, as Klein (1986) has suggested.

In the light of the various problems identified so far, a more logical methodological procedure to follow, it would seem, is to establish a longitudinal perspective of a specified length, depending, inter alia, on the characteristics of the targeted linguistic feature, and learners’ learning history and conditions, within which to then study stabilization. This would entail, at least, four phases of research: (1) determining whether or not the subjects are in both an externally and internally favorable position to make progress; (2) establishing which features exhibit stabilization; (3) identifying the underlying processes; and (4) analyzing the processes and making well-grounded judgments about whether or not the stabilized linguistic feature will result in fossilization. This would be a more systematic approach to studying fossilization than any that has been attempted so far, and would have some positive consequences. First of all, it would require researchers to precede their investigation with a careful examination of learning conditions, external and internal, not a forthright assumption of an equation between LOR and external circumstances favoring or disfavoring language acquisition. Second, it would take researchers beyond their current scope of concern, i.e. identifying stabilization, into the underlying processes or factors, hence shifting the focus of attention away from product to process. Finally, it would tie fossilization research in with SLA research on other issues such as transfer, UG, input, and critical period, just to name a few, as researchers strive for a sound interpretation of the processes that cause the attested stabilization. Indeed, as Kellerman (personal communication) rightly points out, “the question is not just why one person ‘fossilizes’ and another doesn’t – it’s what causes the ‘fossilization’ in the first place”.

Research to date suggests that there is no single ontological account of fossilization. Future research should therefore concentrate on exploring the interaction of multiple factors (e.g. linguistic, psycholinguistic, neurolinguistic, and sociolinguistic).

SLA research over the past thirty years has ushered in a myriad of perspectives on fossilization from which miscellaneous speculations were made, yet without much empirical validation. This imbalance between theorizing and empirical investigation has profound limitations that restrict our understanding of a putatively defining feature of SLA.

Despite the existence of a variety of methodological difficulties, however, conducting well-designed empirical studies is no longer inconceivable. With the field of SLA advancing at such an unprecedented pace and with its landscape significantly broadened, abundant theoretical and methodological
insights are being made available which researchers can draw upon to inform the design of their empirical research.

Notwithstanding its yet-to-be-determined nature, the construct of fossilization has enjoyed a great deal of popularity in the SLA literature as well as that of SLT and will continue to do so in the years to come. Thus, further research is warranted. From a theoretical point of view, on the one hand, it directly contributes to a resolution of the logical and developmental problems, the two fundamental issues of SLA research. From a practical standpoint, on the other hand, this continued effort may, in the long run, aid second language educators in identifying what is or is not learnable/teachable, and more importantly, in searching for pedagogical strategies that can narrow the scope, and delay the onset, of fossilization, thereby stimulating and enhancing learning.

Acknowledgment

I am grateful to Larry Selinker, Diane Larsen-Freeman, and Mike Long for sharing their thoughts on some of the issues discussed here. I also would like to thank the editor and the anonymous reviewers for their comments and suggestions; the audience at my SLRF 2002 presentation for their stimulating questions; and Paula Korsko and Jung Eun Year for their research assistance. Any errors are my own.

Notes

1. The notion of ‘fossilization’ dates back to scholars such as Weinreich (1953) and Nemser (1971). Weinreich, for example, talked about “permanent grammatical influence” (cited in Selinker 1992: 41) and Nemser about “permanent intermediate systems and subsystems” (ibid: 174). Both researchers not only recognized the phenomenon but also integrated it into their theoretical perspectives. (For an accessible discussion of the earliest thoughts on fossilization, see Selinker 1992.)
2. One reviewer shared his observation that “the notion of fossilization is presently considered by many researchers to be outdated and even taboo”, and that it has been superceded by “endstate”, “steady state”, and “ultimate attainment”. This is not consistent with what we really see in both the SLA and the second language teaching literature. Although it is true that the recent SLA literature has seen few empirical studies of fossilization, what is equally true is that the literature has continued to exhibit frequent use of the term “fossilization”. While it is beyond the scope of this paper to address the commonalities and differences between fossilization studies and those on “endstate” or “ultimate attainment”, suffice it to say that they each deal with a different yet related aspect of interlanguage but represent very different conceptions of interlanguage. For a detailed discussion of this issue, see Han (2003b).
3. Note here that there is a difference in scope between “cessation of learning” and “ultimate attainment”: while both refer to non-development, the former is local and the latter global, pertinent to the entire interlanguage, hence “fossilized interlanguage”.

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4. Kellerman (1989) uses *fossilization* as both a non-countable noun and a countable noun to refer respectively to the process and to the product.

5. In simplistic terms, this means that prior learning (i.e. learning a first language) acts against current learning (i.e. learning a second language).

6. David Birdsong, in many of his publications, has referred to L2 ultimate attainment as asymptotic (see e.g. Birdsong 1999). It is important to point out that his notion of “asymptote” is not identical to “fossilized competence”. According to Birdsong (personal communication), “[asymptote] is an idealization of an end state (L1 or L2) that doesn’t commit one to a literal ‘steady state’, allowing for Johnson et al. 1996 ‘indeterminacy’, accumulation of lexis, that kind of thing”. This view makes no presumption about whether L2 ultimate attainment is target-like or non-target-like, but it does suggest that “any further development would be scarcely measurable”. With “fossilized competence”, on the other hand, the implication is that the entire interlanguage can permanently cease developing.

7. SLART-L (SLART-L@LISTSERV.CUNY.EDU) is an on-line discussion listserv dedicated to discussion of L2 acquisition and L2 teaching-related issues.

8. One reviewer questioned the use of terms such as ‘success’ and ‘failure’ here by noting that they suggest two things that might not be true: (a) that the fossilized learners in question wanted to become native-like to begin with; and (b) that the success of a learner should be measured in terms of how well he/she approximates a native speaker. This point being taken, I would like to point out, in response, that failing to reach the target – be it native-like proficiency or otherwise – is a reality in adult L2 acquisition that warrants investigation and explanation.

9. Long and Robinson (1998: 20) have gone further to claim that “very few, if any, older learners achieve even *near-native* abilities” (emphasis added).

10. Selinker and Han (2001) cast doubts on the validity of using “near-natives” for studying ultimate attainment. In their view, fallibility is likely to result if the assumed “near-natives” are not true ones and/or if the putative “near-natives” have not reached ultimate attainment. White and Genesee (1996) express a similar concern, though the question they pose relates primarily to the procedures adopted in previous studies for selecting “near-natives” as subjects.

11. General failure and differential success are two dimensions of L2 ultimate attainment. The former is viewed from a cross-learner perspective, whereas the latter is from both a cross-learner and a within-learner perspective. As argued here, the two are interrelated in that the latter constitutes the former.

12. Marinova-Todd, Marshall and Snow (2000: 18) remind us that “adults are not a homogeneous group of linguistically incompetent creatures”, and they highlight the fact that despite the seemingly vast amount of failure, successful adult L2 learners do exist whose linguistic performance even surpasses that of native speakers.

13. The “permanently arrested development” can occur, independently, at various levels along the dimensions of “knowledge” and “control” (Bialystok 1994; Sharwood Smith 1986). This would include cases where learners seem to have developed correct knowledge vis-à-vis a target language feature but never seem to be able to gain complete control over the use of it under ‘real operating conditions’ (Johnson 1996).

14. To use *fossilization* as an explanation for L2 ultimate attainment is non-illuminating as well as self-defeating; among other things, it signals an
end-point, rather than a point of departure, for understanding SLA. More importantly, in light of the fine-grained analysis pursued here, it is counterfactual to equate L2 ultimate attainment with fossilization (see also Han 2004).

15. Views differ on whether fossilization should be associated solely with deviance. Long (2003), for example, contends that it is hard to imagine a cognitive mechanism that only generates non-target-like rules and forms, suggesting that fossilization concerns both target-like and non-target-like features. While it is beyond the scope of the current article to discuss this issue, it is worth noting that the theoretical debate about this has, in fact, been going on for quite a long time (see e.g. Perdue 1984 and Brown 1980 for polarized arguments). Though there is not yet a consensus, the majority of researchers who have employed the term seem to have kept it exclusively for deviance (for a review, see Han 1998).

16. A detailed summary of the studies is given in Han (2003a, 2004).

17. Evidence abounds of L2 learners from different L1 backgrounds approaching the same TL feature at different rates and via different routes. Hammarberg (1979, cited in Kellerman 1984), for example, noticed that while learners from different L1 backgrounds went through the same stages in their acquisition of the placement of the negative particle in Swedish in both main and subordinate clauses, native speakers of English learning Swedish as the L2 skipped the first stage of preverbal negation, owing to the fact that English does not permit it. Thus, compared with learners from other L1 backgrounds, it took them a relatively shorter time to acquire this particular TL feature. (For more examples, see Kellerman 1984.)

18. Acquisition can be complete or incomplete (Schachter 1990). Fossilization, for me, does not entail zero acquisition but rather incomplete acquisition.

19. By “optimal learning conditions”, I mean continuous exposure to the TL input, adequate motivation to learn and sufficient opportunity for practice.

20. Larsen-Freeman (1997: 151) challenges the notion of target language: “[T]he very phase ‘target language’ is misleading because there is no endpoint to which the acquisition can be directed. The target is always moving.” This view sounds quite extreme to me, though I do agree that language is a dynamic process.

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