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# Sociolinguistics

*The Essential Readings*

Edited by

Christina Bratt Paulston  
and  
G. Richard Tucker

2003

 **Blackwell**  
Publishing

# Linguistic Diversity, Schooling, and Social Class: Rethinking Our Conception of Language Proficiency in Language Minority Education

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In the last half century, concern for the low educational achievement of linguistic minority children has led to a debate for and against bilingual education – that is, an education in which subject-matter, including literacy, is taught in both the child’s native language and the majority language, English here. Attempting to enlighten the debate, Cummins (1980) introduced a distinction between basic interpersonal communicative skills (BICS) and cognitive-academic language proficiency (CALP). Cummins believed that teachers and other decision-makers might perceive language minority children who speak English on the playground or with classmates as ready for all-English classes, where he believed they might experience academic failure because they had not yet learned “cognitive-academic” aspects of English. Moreover, Cummins hypothesized that this aspect of language proficiency was specifically a property of the *first language*: “There exists a reliable dimension of proficiency in a first language which is strongly related to cognitive skills and which can be empirically distinguished from interpersonal communication skills such as oral fluency, accent, and sociolinguistic competence” (1980, p. 177).

While we join Cummins in supporting bilingual education programs,<sup>1</sup> we believe there are undesirable conceptual consequences of the BICS/CALP distinction as it is currently formulated. Specifically, we argue that the distinction confounds language ability and academic achievement, and does not take into account crucial differences between first and second language development; in this connection, we further argue that a consequence of the BICS/CALP distinction is the ascription of special status to the language of the educated classes, a view we find indistinguishable from classical prescriptivism, the idea that the variety of language spoken by more prestigious social groups is inherently “more correct” and thus regarded as superior to other varieties (Crystal 1986). We end by presenting an alternative conception of the relationship between school achievement and language development, which – for those who prefer acronyms – we call SLIC, or *second language instructional competence*, defined as the stage

of second language (L2) development at which the learner is able to understand instruction and perform grade-level school activities using the L2 alone, in the local educational context.

## 1 The BICS/CALP Distinction

Although Cummins's BICS/CALP distinction persuaded many educators against prematurely mainstreaming English learners, a number of researchers responded with criticism (Edelsky et al. 1983; Genesee 1984; Spolsky 1984; Troike 1984; Martin-Jones and Romaine 1986; Wiley 1996). A frequent concern was that conflating *knowledge of language* and *academic knowledge* as "cognitive-academic language proficiency" produced a conception of language proficiency that granted special status to the language of school – and hence to the language of the educated classes.

We argue that Cummins's view that schooling has the effect of improving our language implies that the language of the educated classes is in certain respects intrinsically richer than – or an improved version of – the language of the unschooled or working class. Further, we argue that because the BICS/CALP distinction is applied in the context of *native language development* – not just *second language* – it is conceptually indistinguishable from prescriptivism and related deficit views of working-class language.

Cummins identifies "schooling and literacy" as the agency by which this more advanced stage of development, called CALP or "academic language," is reached:

In monolingual contexts, the [BICS/CALP] distinction reflects the difference between the language proficiency acquired through interpersonal interaction by virtually all 6-year-old children and the proficiency developed through schooling and literacy which continues to expand throughout our lifetimes. For most children, the basic structure of their native language is in place by the age of 6 or so but their language continues to expand with respect to the range of vocabulary and grammatical constructions they can understand and use and the linguistic contexts within which they can function successfully. (Cummins 2000a, p. 63)

Consider other recent definitions:

In short, the essential aspect of academic language proficiency is the ability to make complex meanings explicit in either oral or written modalities by means of language itself rather than by means of contextual or paralinguistic cues such as gestures and intonations. (Cummins 2000a, p. 59)

And

Considerably less knowledge of language itself is usually required to function appropriately in interpersonal communicative situations than is required in academic situations. . . . In comparison to interpersonal conversation, the language of text usually involves much more low frequency vocabulary, complex grammatical structures, and greater demands on memory, analysis, and other cognitive processes. (Cummins 2000b, pp. 35–6)

Let us consider for a moment a few of the specific properties Cummins associates with academic language – characteristics of the linguistic system which he believes distinguish BICS from CALP, or conversational language from academic language, in the first language context. CALP is said to involve the ability to make meanings explicit by means of language itself rather than by means of gestures and intonations. However, there is no reason to believe, and no evidence to support, the presumption that academics are better at explaining their craft than the less schooled are at explaining theirs, or that accompanying gestures are less useful to academics than to others. Imagine a typical professor, for instance, trying to talk in detail about farming, boat building, or auto repair. Academics would typically lack knowledge of relevant vocabulary in these contexts – words which would be “low frequency” for them, but not for many others. Moreover, we might wonder why one would consider academic language to involve “complex grammatical structures” in comparison to non-academic language. Are double negatives less complex than single negatives? Is *ain't*, a socially stigmatized contraction, less complex than *won't*, a socially acceptable one? Minimally, we would expect to see an explicit and theoretically defensible definition of linguistic complexity accompanying the claim that academic language is more complex than non-academic language, and then we would expect empirical evidence showing that, for some distinctive trait *t* of academic language which meets the definition of linguistic complexity, there is no trait *t'* of non-academic language which is as linguistically complex as *t*. Historically, a number of attempts have been made to distinguish languages or language varieties in such terms, but none have succeeded (Bernstein 1971; Crystal 1986; Milroy and Milroy 1999).

Although Cummins has frequently stressed that he did not intend to rank CALP above BICS (Cummins 1979, 2000a, 2000b), it is essentially *necessary* in his framework for BICS to precede CALP developmentally in order for his basic argument to succeed. Cummins's proposal was that, while BICS develops fairly rapidly in immigrant children, producing “surface fluency” early on, several more years are usually required before children develop sufficient levels of CALP to warrant placement in an all-English classroom. Cummins argued that this developmental dimension was essential to a theory of language proficiency, advocating that such a theory “must incorporate a developmental perspective so that those aspects of communicative proficiency mastered early by native speakers and L2 learners can be distinguished from those varying across individuals as development progresses” (1981 p. 11).

More recently, Cummins has asserted that BICS and CALP follow “different developmental patterns” (2000a p. 62), disapproving of August and Hakuta's (1997) interpretation of BICS as developmentally prior to CALP (p. 61). However, if the sequential order of BICS and CALP in immigrant children were dependent on individual experiences and situations, as Cummins (2000a p. 61) has asserted, then BICS would not normally precede CALP: Many (perhaps most) immigrant children have their first exposure to English in the classroom, where CALP is supposed to be found, and may seldom speak English on the playground, where BICS is presumably spoken. If BICS does not necessarily precede CALP in development, then the originally intended usefulness of the distinction is severely weakened, since educators might just as well expect CALP to develop first, and in no less time than BICS. On the other hand, if BICS and CALP *are* developmentally related, with BICS coming before CALP – as

Cummins (1981 p. 11) maintained in earlier work – then the two forms are explicitly ranked, with CALP being a developmentally more advanced form of language than BICS. Thus, if we preserve the developmental ranking of BICS and CALP, the implication of Cummins's framework is that the *language* of school itself – not just its social rewards or content – is an advanced or improved version of non-academic language. Put differently, in the context of first language development, the distinction implies that the language of the educated classes is inherently superior to the language of the working class.

In response to criticisms, Cummins (2000b) has written that “the greater relevance of academic language proficiency for success in school, as compared to conversational proficiency, does not mean that it is intrinsically superior in any way” (p. 75). If “academic language proficiency” were indeed understood in terms of *contextual relevance* or *situational/cultural appropriateness*, the notion would not be problematic. Indeed, when features of literary discourse (peculiar vocabulary, impersonal author, distant setting, special order of events, and so on) are present in the oral language of children, as may be seen even among very young middle-class children (Scollon and Scollon 1982), then achievement in school literacy becomes much easier, since much of the enterprise of learning to read and write has been accomplished before the child reaches school.

However, this “middle-class advantage” relates not to some presumed superior quality of the oral language of middle-class children, but to the special alignment of their particular home experiences and speech registers with those encountered at school. As Wiley (1996) has put it,

... language proficiency is important in understanding academic success not because it is associated with universal cognitive thresholds, or common underlying language proficiencies, but because it is associated with the norms, practices, and expectations of those whose language, cultural, and class practices are embodied in the schools. Failing to appreciate this, we are left with the illusion that school practices involve universal, higher order cognitive functions and that all other uses of language are merely basic. (pp. 172–3)

Our disagreement with Cummins, then, is over the specific way in which CALP is defined: Rather than identifying cultural and linguistic *differences* which privilege some children, Cummins describes CALP as having specific context-independent properties from which advantages related to academic achievement are derived, and sees schooling as the agency by which basic conversational skills are transformed into the linguistically complex language of the educated classes – more specifically, Cummins distinguishes CALP from BICS by asserting that the former is characterized by an expanded range of vocabulary and complex grammatical structures (Cummins 2000a, p. 63; Cummins 2000b, pp. 35–6), an ability to make complex meanings explicit (Cummins 2000a, p. 59), and greater demand on memory, analysis, and other cognitive processes (Cummins 2000b, pp. 35–6). Considerable research has shown that there simply is no human language or language variety which does not have complex grammatical structures, or the mechanisms to create new words as new situations arise, or to make complex meanings explicit by means of language itself (Crystal 1986; Milroy and Milroy 1991). The common belief that academic language has specially enriched

properties results from a long tradition of prescriptivist dogma, now propagated primarily in the academy – a tradition which has had the principal effect of justifying social inequalities in terms of “objectively assessed” deficiencies located in language, culture, and behavior.

Native language growth is inwardly driven, and all normal children achieve linguistically. During the most active acquisition period (ages 2–6), for instance, children learn approximately 10 to 12 new words a day, often on one exposure and under highly ambiguous circumstances (Gleitman and Landau 1994). Children know things about elementary aspects of sentence structure for which they have no evidence at all (Chomsky 1986; Pinker 1994). In a review of research on child language in the pre-school years, Tager-Flusberg (1997 p. 188) reported that, “by the time children begin school, they have acquired most of the morphological and syntactic rules of their language,” and possess a grammar essentially indistinguishable from adults.

Our language continues to change in various ways as we encounter new experiences, and both schooling and school-based literacy are certainly among common life experiences in literate societies that can influence the structure and vocabulary of our language throughout our lives (MacSwan 2000). But schooling is not unique in this regard; any sustained experience can lead to new specialized vocabulary, new speech styles, and even structural changes. For instance, a skilled boatbuilder will know numerous vocabulary items completely foreign to non-specialists, will have expressions and a way of talking that academics find difficult to understand, and will use his language along with other cognitive resources to accomplish the goals and tasks of the trade.

Hence, in the context of children’s native language, it is important to think critically about how we characterize linguistic changes that may take place as a result of schooling. “Proficiency” is presumed to be quantifiable, and *levels* of language proficiency are presumed to be ordered with respect to one another. If we claim that the usual effects of schooling on native language constitute *improvements* or *gains* in native language proficiency, in ways that other typical sustained experiences do not, then we have developed a conception of language proficiency that is not easily distinguished from classical prescriptivism.<sup>2</sup> In other words, if we say that schooling has a special effect on language proficiency which makes it better (higher, expanded), then we imply that the language proficiency of the unschooled or working class is inferior (lower, basic) in comparison to that of the educated classes.

Cummins explicitly endorses the view that schooling improves our language. For example, he asserts that instruction in school has the effect of *extending* “students’ basic knowledge of syntax, semantics, and phonology . . . into new functional registers or genres of language” (2000b p. 75), and vigorously challenges the view, adopted here and elsewhere (MacSwan 2000), that schooling plays little role in developing language proficiency in the context of native language ability (2000b pp. 106–8). However, while the language used at school may differ in some respects from that used in other contexts, one cannot conclude that school has the effect of *improving* children’s language, as Cummins claims. Schooling may change our language, but what results is *different*, not more complex. In the same way, taking up a new line of work, moving to a new region of the country, or undergoing an apprenticeship to work as a craftsman may very well make one’s language *different* – but not more *complex*. Therefore, in the absence of relevant empirical evidence that shows academic language to be a “complex” or

“expanded” version of non-academic language, we strongly reject the view that school improves our language, or that the language of the educated classes is in any sense richer or more complex than the language of the unschooled.

Numerous scholars have characterized the BICS/CALP distinction and related ideas as a kind of deficit theory (Edelsky et al. 1983; Martin-Jones and Romaine 1986; Wiley 1997; MacSwan 2000). Valencia (1997) defined a deficit theory as one which posits “that the student who fails in school does so because of internal deficits or deficiencies” manifested “in limited intellectual abilities, linguistic shortcomings, lack of motivation to learn and immoral behavior” (p. 2). The transmitters of these deficits, according to Valencia (1997), have typically been located in genetics, culture, class, and familial socialization. Because the acquisition of a native language is an inherent human ability, and because it reflects aspects of our biology and community lives, appealing to *levels* of native language proficiency appears to do precisely what Valencia warned against: It attempts to explain school failure in terms of a presumed “low ability level” of the child in his or her own native language.

Again, Cummins nowhere intended these consequences, and has vigorously defended the BICS/CALP distinction against claims that it represents a deficit theory (Cummins and Swain 1983; Cummins 2000b). We believe that it does, but wish to suggest here that the implications of deficiency inherent in the distinction may be largely avoided by carefully distinguishing between language ability and academic achievement, and between first and second language ability in school-age children.

## 2 Language Ability and Academic Achievement

Cummins sees literacy as “one aspect of communicative proficiency” (1981, p. 14) or “general language proficiency” (2000b, p. 131), and as a component of CALP more specifically (2000b, p. 70). In Cummins’s framework, literacy is an aspect of language proficiency that develops later in life, layered atop the “basic fluency” or “species minimum” that is BICS. A more traditional view, however, which was part of the effort to repudiate traditional prescriptivism, took literacy to be a kind of technology used to represent language graphically. In this view, expertise in the use of print is no more an index of language proficiency than expertise in the use of photography is of visual acuity.

In fact, writing is a very recent human invention which became widespread and publicly accessible only about 500 years ago, with the advent of moveable type, and has been rejected by some societies as unimportant (Gaur 1992). By contrast, language existed long before the technology of writing, and exists in all human societies today. But given Cummins’s conception of language proficiency, we are led inescapably to the conclusion that societies which do not use writing systems have relatively *low* “language proficiency,” restricted only to BICS, in contrast to the “highly proficient” language abilities represented in the academy in literate societies. In our view, then, literacy is an aspect of academic achievement, not a stage of language development.

Unfortunately, confounding language ability and academic achievement can have real-life negative consequences for linguistic minorities. Indeed, it has become a common belief among teachers and policy-makers that some school-age children know

Table 1 Items on "Level C" of the ITP Spanish which require students to answer in complete sentences

Item	Required student response	Prompt
1. ¿Qué está haciendo el niño? [What is the boy doing?]	El (niño) está leyendo/estudiando. [The boy is reading/studying.]	Picture of boy looking at book.
2. ¿Cuántos manos tengo yo? [How many hands do I have?]	Usted tiene dos manos./Tú tienes . . . [You have two hands.]	None.
3. ¿Pueden correr los caballos? [Can horses run?]	Sí, pueden correr. [Yes, they can run.]	None.
4. ¿Vuelan los elefantes como los pájaros? [Do elephants fly like birds?]	No, los elefantes no vuelan. [No, elephants don't fly.]	None.

no language at all. In the Los Angeles Unified School District, for instance, the *Los Angeles Times* reported that 6,800 children were classified as "non-nons," and said to be "nonverbal in both English and their native language" (Pyle 1996). Children are so classified as a result of native language assessments, required for non-English speakers in five states and recommended in four others (Council of Chief State School Officers 1991) with large numbers of immigrant children. However, like the BICS/CALP distinction itself, these tests typically confound academic achievement with language ability, with the result that perfectly capable Spanish-speaking children are labeled as "non-speakers" of their own language.

Consider, for instance, the Idea Proficiency Test I Oral-Spanish (IPT-S) (Amori and Dalton 1996), a very widely used test of oral language (not literacy) which ranks students as "Non-speakers," "Limited Speakers," and "Fluent speakers" of Spanish. The authors of the IPT-S claim to be assessing in part a child's level of CALP, but further assert that test items also assess syntax, vocabulary, comprehension, and verbal expression – presumably BICS (Amori and Dalton 1996, pp. 14–15).

However, an examination of the contents of the IPT-S immediately reveals that the test is much more an assessment of academic knowledge than of language ability. For instance, the second part of the IPT-S asks four questions to which students are required to provide answers in complete sentences, as shown in Table 1. Students who miss these (or any other) four questions on this part are labeled "limited Spanish speaking."<sup>3</sup> After a first incorrect response, the test administrator directs the student to "answer the question in a complete sentence."

Putting aside the inconsistency in the implicit definition of a "complete sentence" and the fantastical and decontextualized nature of the items, we must ask whether the ability to recognize or produce a complete sentence on demand ought to factor into a native speaker's knowledge of language. Indeed, few of us would produce answers like those required above if asked these questions. The natural response to item 1, for instance, is simply *leyendo* or *estudiando* ("reading/studying").

Indeed, one's ability to answer in a fragment reveals detailed covert knowledge of linguistic structure. For instance, if asked a question such as item 4 in table 1, we rely on our knowledge of the internal structure of the phrase to determine possible short-



ened forms of the sentence (in English or Spanish), such as *No* and *No, they don't*; we can also reflect on our knowledge of language to determine which shortened versions are not structurally possible (e.g., *No, they / No, they do*). In fact, answering the question in the desired way requires that we suspend our knowledge of pragmatics, which tells us that we can delete recoverable information, in order to comply with an institutional requirement to respond in a so-called complete sentence.

We only learn about complete sentences in school, which is why the ability to produce or identify them should be regarded as part of the domain of academic achievement, not an aspect of knowledge of language. A language is a set of expressions generated by a grammar, which maps meaning to sound (Chomsky 1986; Pinker 1994). Very early on, children exhibit complex knowledge of word order, word structure, pronunciation, discourse structure, and appropriate use of language in distinct situations. All normal children exhibit this knowledge, regardless of their specific cultural background or life experiences. By contrast, knowledge of particular communities and cultural practices – including those internal to the school – depend upon one's interests, opportunities, and specific environment. If we define *language proficiency* in such a way as to include this sort of highly particular cultural knowledge, what should be regarded as a simple cultural difference suddenly becomes a linguistic dividing line which enormously privileges those with more socially valued cultural capital in hand. Only a small segment of the human race experiences formal schooling, and even fewer excel at it; but all of us know a language.

Confounding these constructs in our conception of native language proficiency is, in our view, an egregious error, with serious negative consequences for linguistic minorities. In the next section, we consider some relevant developmental differences between first and second language in typical school-age bilingual children before proposing some specific ways in which our conception of language proficiency in language minority education might be refined.

### 3 First and Second Language in School-age Early Sequential Bilinguals

We have argued that the association of the BICS/CALP distinction with a school-age child's native language makes it a species of prescriptivism because it represents *linguistic differences* – in this case, differences that are rooted primarily in social class membership – as *linguistic ability differences*. However, L2 learners<sup>4</sup> exhibit errors of a sort which school-age children do not exhibit in their native language. Unlike school-age L1 speakers, L2 learners have developed only partial knowledge of the structure of their target language, and exhibit substantial errors associated with tense, case, grammatical agreement, word order, phonology, and other aspects of structure. We refer to these forms as “errors” because they differ from the target language in terms of core aspects of the grammatical system, and in this respect are akin to the developmental errors observed in very young pre-school children acquiring their native language.<sup>5</sup>

In addition, while all normal human beings acquire the language of their speech community effortlessly and without instruction, L2 acquisition often meets with only partial

success, and frequently depends upon considerable effort and purposely structured input (Bley-Vroman 1989; Coppieters 1987). Evidence suggests, too, that L2 development proceeds with considerable variation in rate and ultimate attainment (Snow and Hoefnagel-Höhle 1978), particularly as the age of onset of exposure to the L2 increases (Bialystok and Hakuta 1994). By contrast, native speakers exhibit remarkable uniformity in language growth (Chomsky 1986; Pinker 1994).

We argued that the BICS/CALP distinction leads to a deficit view of children in the context of native language because language is an inherent human ability which reflects aspects of our biology and community lives. L2 teaching, on the other hand, typically occurs at school, in a context that is outside of our communities, and corresponding L2 learning is subject to considerable variation in rate and ultimate attainment, and appears to be dependent upon extra-linguistic factors. Therefore, following Valencia's (1997) definition of a deficit model, describing a child as having limited ability in an L2 does not suggest "internal deficits or deficiencies" related to the child's genetic makeup, culture, class, or familial socialization. The L2 is specifically not a part of the child's home culture and environment. Thus, unlike attributed ability differences in a child's native language, which are intimately related to biological and cultural identity, ability differences in an L2 will very likely be perceived as a component of success in the academic environment quite generally. For these reasons, the critique of prescriptivism has historically been related only to the context of mature, normal native language ability, and does not apply in the L2 context.

In sum, we believe that the language proficiency construct, in the context of linguistic minority education, crucially must distinguish between language ability and academic achievement, and that blending these constructs in the context of native language ability, in particular, leads to unintended – and undesirable – conceptual consequences. Furthermore, distinguishing between first and second language allows us to clarify that the BICS/CALP distinction implies deficiencies inherent in the child's community only when applied to the first language context. In our final section, we offer an alternative line of thought which we think will avoid some of the pitfalls of the BICS/CALP framework.

#### **4 Conclusion: An Alternative View, An Alternative Acronym**

Separating achievement and language as distinct psychological constructs allows us to contrast the learning situation of majority language and minority language children in school. While majority language children have the single objective of mastering academic content (math, social studies, science, reading and writing) in school, language minority children have *two* objectives which they must meet in order to be academically successful: Like majority language children, they must master academic content; but unlike children in the majority, they must also learn the language of instruction at school. Bilingual instruction allows them to keep up academically while they take the time needed to master English. Also, in the course of developing children's knowledge of school subjects, bilingual education provides background knowledge which serves as a context for children to better understand the presentation of new academic subject-

matter in the L2, and also helps them make inferences about the meaning of new words and grammatical structures they encounter in the new language (Krashen 1996).

Once children have learned English sufficiently well to understand content through all-English instruction, they have developed *second language instructional competence*, or SLIC. Unlike CALP, SLIC does not apply to native language development, and does not ascribe any special status to the language of school. Also, while CALP appears to equate cognitive and academic development, SLIC simply denotes the stage of L2 development in which the learner is able to understand instruction and perform grade-level school activities using the L2 alone, in the local educational setting. A child who has not yet developed SLIC is not considered cognitively less developed; she simply has not yet learned enough L2 to effectively learn through it. The SLIC concept thus avoids the implication that the child is deficient, and still allows us to stress the need for the child to continue to receive interesting, cognitively challenging instruction that she can understand during the time needed to achieve L2 instructional competence.

While we applaud the original intent of the BICS/CALP distinction, we believe that some refinements are needed in view of the unintended negative consequences of CALP outlined here. By distinguishing between academic achievement and language ability, and between first and second language development in school-age children, we may be better able to characterize the language situation of linguistic minorities and their achievement in school. We hope the notion of *second language instructional competence* contributes to this goal.

## Notes

- 1 For a review of research on the effectiveness of bilingual education, see August and Hakuta (1997).
- 2 On the other hand, BICS/CALP proponents might argue that new experiences of any kind might have an enriching effect on language and "cognitive development," leading to gains in language proficiency and achievement, and that CALP describes gains in native language proficiency in the narrow context of schooling. On this view, we would no longer be able to compare or rank proficiency levels across domains (farmer language, banker language, school language, basketball language), so describing CALP (school language) as "expanded" in relation to BICS (language associated with other environments) would be impossible, undermining the usefulness of the distinction; and if school language is not necessarily associated with greater cognitive ability than other forms of language, then its relationship to achievement in school would also need to be recast.
- 3 According to the IPT-S scoring procedures, kindergarteners who take the test for initial identification must miss nine items on this part of the test to be regarded as "limited Spanish speaking"; kindergarteners who take the test for redesignation, like all others, are "limited" after just four "errors" (Amori and Dalton 1996, p. 39). Of course, no justification is presented for these arbitrary decisions.
- 4 For our purposes, an L2 learner is one who began learning a second (or other subsequent) language some time after the first was settled, around the age of 5 or so. For discussion, see Bhatia and Ritchie (1999, pp. 579–82) and Gass and Selinker (2001, pp. 100–4).
- 5 We wish to be precise in our definition of "error" in the second language context. We assume that a second language learner possesses a learning mechanism LM that generates values for a grammar G on inferences from a target T, where T is primary linguistic data from the second language; LM maps G from an initial state, G<sub>0</sub>, to a steady state, G<sub>S</sub>, where G<sub>S</sub> is compatible with T. An

*error* is a linguistic expression compatible with  $G_0 < G_n < G_S$ . Some researchers prefer to think of such expressions as instances of “negative transfer” from the native language, while others think of them as analogous to developmental errors in child language acquisition. For our purposes, this issue is not relevant, and neither is the nature of the initial state  $G_0$ ; but see Schwartz (1998) for some interesting discussion.

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