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Published in *Linguistic Review*, vol. 19, no. 1-2, pp. 51-71, June 2002

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Development of the concept of “the poverty of the stimulus”

MARGARET THOMAS

Abstract

‘The poverty of the stimulus’ is a key concept within generative linguistics. This article attempts in three ways to better understand the nature of that concept and the context of its use: first, by narrating its history from the late 1950s to the present day; second, by analyzing the properties of a family of terms (including “the poverty of the stimulus”) which generativists have developed to refer to the relationship between input to language learners and their linguistic competence; and third, by examining some examples of how “the poverty of the stimulus” has been differently construed in recent discourse about linguistics and about language acquisition.

1. Introduction

More than any other claim, the assertion that input to language learners is incommensurate with what they end up knowing distinguishes generative from non-generative linguistic literature. Depiction of children’s exposure to primary linguistic data as inadequate to account for their eventual competence is now a predictable feature of the introductory pages of texts which argue for the virtues of a generative framework. This has not always been the case. It took about fifteen or twenty years for the relationship between input and language learners’ knowledge to achieve its present status as a cornerstone of generative theory. Moreover, slightly different perspectives on the phenomenon in question have given rise to – and likely been shaped by – a variety of ways of talking about it, and a variety of labels. One such label is “the poverty of the stimulus.”

This article examines how the concept of the poverty of the stimulus developed, how it is related to adjacent concepts and terms, and how it has been understood and employed in debates between generative grammarians and lin-

guists who would not identify themselves as generativists. I have essentially three points to make. First, generative theory became self-conscious of the concept of the poverty of the stimulus only gradually, with the articulated form that it now takes developing in stages. Certain aspects of what “the poverty of the stimulus” has earlier referred to have been superseded, while other aspects of its meaning have been consistently maintained. Second, the term participates in a complex network of related expressions and partial synonyms, each of which offers a distinctive prospect on the terms’ common referential domain. Some of these terms have curious or unanticipated properties which may have had the effect of subtly mis-representing their referents. Third, I find that the concept has been diversely construed, sometimes misconstrued, and sometimes ignored, in academic debate. As one result, opportunities for informed exchange about the nature of language acquisition are reduced.

2. Evolution of the concept

A first attestation of the term “the poverty of the stimulus” appears to be in Chomsky (1980a: 34). He identified it as “a variant of a classical argument in the theory of knowledge,” citing Socrates and Descartes as having asserted that humans possess innate knowledge, that is, knowledge which cannot have been derived from the environment “since the stimulus [to that knowledge] does not resemble what the mind produces on the occasion of stimulation” (1980a: 35). Thus Chomsky initiated the term in a context which denied its conceptual novelty. I will put aside the interesting question of to what extent ancient Greek or seventeenth-century French philosophy can legitimately be treated as background to the modern notion, to focus here on its development within generative linguistics from the mid-twentieth century onward. Within that time-frame, the concept now referred to as “the poverty of the stimulus” began to emerge before the term first appeared in 1980, and it has continued to evolve in the years since then.

2.1. Early background up to 1970

In Chomsky’s longer texts, it is now standard for an exposition of first language acquisition to serve as the initial jumping-off point, with the notion of the poverty of the stimulus playing a central role in that exposition. However, this rhetorical convention was not present from the beginning of generative linguistics. The acquisition of language has always had theoretical importance in the work of Chomsky and his colleagues, but in the late 1950s and early 1960s it did not have the central position that it now enjoys, nor was it represented in exactly the same manner as it is now. Moreover, within the discussion of lan-

guage acquisition that did take place, a notion of the poverty of the stimulus is only indistinctly recognizable. Chomsky’s *Syntactic Structures*, from 1957, did not dissect the experience of language learners, although it is possible to extrapolate from it something of his view of acquisition. For example, Chomsky remarked in passing that humans are able to produce and understand any number of utterances despite having had only “finite and accidental” (p. 15) exposure to language. But he did not elaborate on the point.¹ Written in that same decade, *The Logical Structure of Linguistic Theory* (Chomsky 1956/1975a) treats language acquisition similarly. The text presents the following as a first fact that a theory of language has to explain: “A speaker of a language has observed a certain limited set of utterances in his language. On the basis of this finite linguistic experience he can produce an indefinite number of new utterances” (p. 61). In characterizing the limitless capacity of the end-state of language learning as achievable in a context of “finite linguistic experience,” Chomsky incorporated into this passage one facet of what later became the concept of the poverty of the stimulus. But Chomsky did not directly address how limitations inherent to the input to a learner bear on the design of linguistic theory, and in this sense *The Logical Structure of Linguistic Theory* seems typical of early generativism. What is more, the placement of this passage signals something about how it has been valued. When the text was first published in its revised 1975 edition, the passage appeared on the first page of Chapter 1. But in his introduction, Chomsky (p. 3) remarks that what became Chapter 1 in the published version of the text had been written as Chapter 10 in 1956. Presumably, then, the passage spent the long interval during which *The Logical Structure of Linguistic Theory* circulated on microfilm and mimeograph buried deep in the text. It was only in 1975 that Chomsky moved this reference to language acquisition – oblique as it is – into prominence at the beginning of the book.

Also published in the first wave of generative literature was Chomsky’s (1959) review of Skinner’s *Verbal Behavior*. Out of necessity, this text discussed language acquisition. But it did so without advancing a concept of the poverty of the stimulus. Chomsky framed his critique of Skinner as an argument that vastly more attention needed to be paid to what a language learner brings to the act of acquisition. That is, Chomsky felt that “external factors” bearing on language acquisition had in Skinner’s work become exaggerated at the expense of investigation into the learner’s inherent “internal structure”

1. In response to critics’ charges that *Syntactic Structures* does not address the psychological reality of language, Chomsky (1980b: 43) insisted that the book “is explicitly concerned with LF [language faculty]-theory.” His efforts to specify the nature of the human language faculty do, indisputably, underlie Chomsky’s whole program of linguistic research. But what is in question here is, more specifically, a conceptualization of input to language learners and the role of that input in relation to the language faculty. Generativist theorizing in the era of *Syntactic Structures* and up until the early 1970s rarely addressed these matters.

(1959: 27). Chomsky took it as his business to redress underacknowledgment of that internal structure, rather than to divert yet more attention to the properties of “external factors.” Thus, although Chomsky (1959) famously argued against a theory of language learning which would have denied significant poverty to the stimulus – had the notion been articulated enough to have been debated – the review itself is not a major contribution to the development of that concept.

Chomsky’s (1962) article “Explanatory models in linguistics” raised the profile of language acquisition in that it opened and closed with references to the theoretical importance of understanding how children learn language. But in the model that Chomsky built for child language acquisition, he depicted input to learners as (simply) “a sufficiently large and representative set of utterances” (1962: 530), without adverting to any intrinsic deficiency in that set. He suggested (without committing himself to this as a necessity) that input might include information about what counts as an inadmissible sentence, and information identifying sentences which are “in an appropriate sense, repetitions of one another” (1962: 531). Looking back at this text 40 years later, it appears that Chomsky assumed a rather rich contribution from the environment, on two counts. First, he admitted the plausible relevance of varieties of input – negative evidence, evidence about synonymy – which later versions of generative theory have resoundingly excluded. Second, he did not question the adequacy of input to inform learners about the properties of a language.

In these ways, it is fair to say that Chomsky’s earliest work, even where it explicitly addresses language learning, does not incorporate a developed notion of the poverty of the stimulus. To borrow Pullum and Scholz’s terms, what they call the properties of productivity, finiteness, and idiosyncrasy were first brought forward to characterize the relationship between input and knowledge of language. Degeneracy – the presence in natural language of diverse errors and anomalies – was sometimes referred to in the 1950s and early 1960s, but not in the context of language learning. For instance, Chomsky (1962: 531) adverted to the existence in speech of “interrupted fragments, false starts, lapses, slurring, and other phenomena that can only be understood as distortions of the underlying idealized pattern.” But his goal in this passage was to distinguish performance from competence, by emphasizing that the real output of a grammar may diverge from its idealized formal product. He didn’t frame the degeneracy of speech as an obstacle to acquisition. Most significantly, what Pullum and Scholz identify as the real crux of the notion of the poverty of the stimulus, namely the assertion of “stimulus absence,” was not present in early generative writings.

Moving further into the 1960s, there began to surface in generative literature fragmentary references to acquisition which acknowledged a discrepancy between evidence available to learners and the knowledge that their competence

implicates. In 1964, Chomsky wrote that “On the basis of limited experience with the data of speech, each normal human being has developed for himself a thorough competence in his native language” (pp. 8–9). When one compares this statement to those cited above from Chomsky (1957) or (1956/1975a), it doesn’t seem to go much farther in direction of characterizing the relationship between input and grammatical knowledge. But a footnote in *Aspects of the Theory of Syntax* (1965: 201) took an important step in asserting that “the primary linguistic data that [the child] uses as a basis for [...] theory construction may [...] be deficient in various respects.” A few years later, Chomsky wrote that “the native speaker has acquired a grammar on the basis of very restricted and degenerate evidence” (1968/1972: 27). That same year he argued in an interview for the plausibility of a Universal Grammar, “given the scattered and degenerate” nature of data available to learners (Chomsky and Hampshire 1968: 687). Still, such remarks have an offhand, impromptu, air to them. Not only do they sometimes have to be mined out of obscure footnotes, but one is struck by how often characterizations of the limited or deficient nature of input are in this period buried within Chomsky’s subordinate clauses rather than being asserted outright as the direct target of his exposition. For example, the text surrounding the passage from *Language and Mind* (1968/1972) does not illustrate the restrictedness or degenerative nature of linguistic evidence, or dwell on that claim in any other way. What we now read between these lines as an invocation of the poverty of the stimulus is nowhere explicit, but rather incorporated as if its truth and importance had already been established.

Thus it is fair to say that during the 1960s, the (yet unnamed) concept of the poverty of the stimulus was consistent with the emerging framework of Chomsky’s linguistics, but it had not yet been singled out as a critical constituent of that theory, nor was it very fully articulated. Early generative grammar developed without the deliberate and skeptical analysis of the relationship between input and competence which, 30 or 40 years later, now serves as generativism’s signature warrant.

2.2. From around 1970 through the early 1980s

It was during the next decade that the poverty of the stimulus began to receive direct, sustained, attention. Stanley Peters’ 1972 article was an important contribution. Peters coined the term “projection problem” to label the task of deriving a grammar from data, that is, from the evidence of how people normally speak and understand others’ speech. He documented some of the limits of those data (pp. 177–179): markers of ungrammaticality are absent, and the surface features and distribution of (for example) restrictive versus non-restrictive relative clauses reveal little about their contrasting grammars and meanings.

Peters attended to what he saw as two instances of the same projection problem, namely, that faced by a child learner for whom the task is to determine a grammar for his or her native language, and that faced by a linguist trying to create a “general scheme” (p. 172) for deriving grammars. He speculated about the nature of the data from which a child (in his words) “projects” a grammar, raising questions about what aspects of those data are likely to be influential or necessary (pp. 175–177). But in fact, Peters’ discussion seems more focused on trying to understand the linguist’s problems than those of the learner. Nowhere does Peters distinguish the tasks of the professional linguist and the “little linguist”: they both aim to accomplish the same goal, and they both start out with the same raw materials.² Although his text moves fluidly between what he saw as two aspects of the same problem, he wrote from the point of view of a working 1970s generativist, in that his argument veers quickly into matters of explanatory versus descriptive adequacy, or the need for a more restrictive grammatical theory. It seems to have been characteristic of this interval that the study of child language learning was incorporated into generative theory by analogizing the work of the child to the work of generative theorists themselves. This is unmistakably a case of the child’s experience being analogized to, and perhaps subsumed into, that of the theorist and not vice versa. With this orientation, it is not surprising that Peters did not speculate about the linguistic environment of children or try to grasp the properties of input from the point of view of the child learner. Those now-familiar features of discussion of the projection problem emerged later.

On the other hand, one aspect of Peters’ work was immediately taken up and built upon. That was his effort to point out particular aspects of a grammar which, in his view, posed a projection problem. From the early 1970s onward, generativists began to accumulate an inventory of such examples illustrating their claims that the surface features of language cannot fully communicate to learners the properties of the grammar which produces them. Chomsky (1975b: 30–35) introduced the notion of structure dependence as a hypothetical language universal, asserting that children create only structure-dependent grammars although no feature of the input eliminates structure-independence. Chomsky’s key example – that English-learning children do not form questions like **Is the man who ___ tall is in the room?* – eventually became what Crain (1991: 602) called the “parade case” in discussion of the poverty of the stimulus.

A 1979 article by Baker came up with other examples which have achieved classic status in expositions of the poverty of the stimulus. Among them are the ambiguity of *Flying planes can be dangerous*; the contrast in grammaticality

2. Peters does not use the term “little linguist,” but his conception of language learning seems fully consistent with the view of child learners associated with that expression.

between parallel sentences like *The child seems sleepy* and **The child seems sleeping*; speakers’ intuitions that apparently congruent sentences such as *John is eager to please* and *John is easy to please* have radically different structures; the interpretation of anaphoric relations between *Oscar* and the pronoun in *Realizing that Oscar is unpopular doesn’t bother him*; and the matter of how to appropriately constrain the application of what was then known as the “Dative Transformation.” Many of Baker’s examples were already famous, having been introduced into earlier generative literature to illustrate the kinds of tacit knowledge of language that (adult) native speakers possess. What Baker did was re-cycle them in the context of the learnability issue: what is language acquisition, such that children grow up to know these facts about English? Baker employed these data in his argument for the existence of the projection problem – or what he referred to at one point as the “deductive gap” (p. 234) between input and competence – claiming that speakers cannot arrive at the relevant intuitions of grammaticality or ambiguity merely by exposure to primary linguistic data.

The inventory of examples which Baker amassed to illustrate the “deductive gap” between input and knowledge has since passed from hand to hand, granted some shifting and reanalysis of its contents. In retrospect, his article also made two other significant contributions to the development of the concept of the poverty of the stimulus. One is that Baker examined the nature of the projection problem more closely than had any earlier writer. He went far beyond Peters in inquiring into what the “projection problem” might mean in the real context of child language acquisition, and repeatedly pointed out how grammatical theory needed to profit from that inquiry. For instance, Baker questioned the relevance of negative evidence and speculated about how a child might retreat from an overly-inclusive grammar. Another of Baker’s contributions is that he initiated a tradition of decomposing the projection problem into several parts: in his analysis, input to a learner is intrinsically inadequate as a comprehensive source of what he or she knows because (a) input is finite whereas a learner’s ultimate capacity is infinite; and (b) input informs learners only about well-formed sentences, not about ungrammaticality or ambiguity.³

Baker advanced the concept of the poverty of the stimulus substantially. But he wrote in an environment where the penetration of that idea into linguistic theory remained fairly shallow; as he put it, there were then “few indications of any concrete understanding of either the projection problem itself or the precise manner in which a [generative] theory [...] might solve it” (p. 234). The same year that Baker’s article appeared, Smith and Wilson published a book entitled *Modern Linguistics: The Results of Chomsky’s Revolution*, which corroborates

3. Point (a) is evidently Pullum and Scholz’s property of finiteness, while point (b) subsumes Pullum and Scholz’s positivity.

Baker's complaint.⁴ Smith and Wilson (1979) survey Chomsky's whole oeuvre up to 1977 and many works by his students and colleagues. The book includes several sections devoted specifically to language acquisition. Yet it makes no reference at all to the concept of the poverty of the stimulus, under any of its then-current labels. Further, there is no evidence in any of six contemporary reviews of *Modern Linguistics* that the book's critics found this absence remarkable.⁵ By the late 1970s the notion had been articulated, but had not worked its way into the consciousness of the discipline.

Soon afterwards, however, there followed a period of rapid conceptual and terminological development with respect to the poverty of the stimulus. The year after Baker's article was published, the term itself debuted in Chomsky's *Rules and Representations* (1980a: 34). Baker and McCarthy (1981: xi) augmented the vocabulary of generativism with the expression "the logical problem of language acquisition," attributing it to David Lightfoot. "The logical problem of language acquisition" has since displaced earlier coinages to become what is probably the standard label for the phenomenon within which the poverty of the stimulus serves as a basic premise. 1981 also saw another expression, "the deficiency of the data," appear in Hornstein and Lightfoot (1981: 9).

Equipped with this provocative array of new terms, more linguists started writing about the poverty of the stimulus, and started analyzing its role in generative theory. Hornstein and Lightfoot expanded Baker's bifurcation of the concept into what has become the canonical tri-partite characterization. In their 1981 version, input to a child learner is "deficient" or "impoverished" because it (a) encompasses anomalies like fragments and slips of the tongue; (b) is finite; and (c) contains no evidence for the relationships of synonymy, ambiguity, and ungrammaticality assumed to be recognized of all speakers (Hornstein and Lightfoot 1981: 9–10). Around the same time, Chomsky (1980b: 42) distinguished what he labeled the "degeneracy" of the stimulus (Hornstein and Lightfoot's (a)) from the "poverty" of the stimulus (Hornstein and Lightfoot's (c)). Chomsky's claim was that, in his terms, poverty but not degeneracy is the essential obstacle for an input-driven theory of language acquisition.⁶ From

4. I am indebted to David Lightfoot for bringing this text to my attention.

5. Reviewers found fault with Smith and Wilson on various grounds, but not for any failure to bring attention to a gap between input and competence. On the contrary, the text's depiction of generativism was typically praised as "comprehensive" (Binnick 1981: 182) or "accurately presented" (Ebert 1981: 420).

6. In making this distinction, Chomsky acknowledged a shift which had led generativists away from highlighting the anomalous nature of input to child learners. We have seen that in the 1960s and 1970s references were sometimes made in passing to potentially misleading irregularities or messiness in natural language (e.g., Chomsky 1965: 58). In response, work such as that of Snow (1972) and Snow and Ferguson (1977) sought to show that the data to which

here on out, Hornstein and Lightfoot’s aspect (a) of what had been subsumed under the concept of the poverty of the stimulus receded into the background. Lightfoot’s 1982 book *The Language Lottery* further developed the importance of the poverty of the stimulus and illustrated it with examples still in circulation today, including a range of facts about the interpretation of anaphors and pronouns, *one*-pronominalization, and *that*-trace effects. Other, related, terms have continued to emerge including “Plato’s problem” (Chomsky 1986: xxv), “the underdetermination problem” (O’Grady 1991: 157), and “the learnability problem (condition/theory)” (Wexler and Culicover 1980; Pinker 1984).

2.3. Recent developments

Since 1980 the concept of the poverty of the stimulus has more firmly established its identity, and become more and more integrated into generative theorizing. Three recent developments from the past twenty years are worth noting. First, Crain and Nakayama (1987) broke with the tradition going back to the 1970s which had simply assumed without discussion that the poverty of the stimulus does not present an insuperable barrier to learners. In particular, Crain and Nakayama set out to test empirically whether children do, in fact, fail to create structure-independent questions like **Is the man who ___ tall is in the room?* even though the input does not signal to learners that such sentences are ungrammatical. That fact had been asserted but not, until then, proven.

Crain and Nakayama’s research demonstrated that children do not produce the relevant ungrammatical question structure. (It did not, however, establish that children recognize it as ungrammatical.) The article marks a shift in that, from around the middle 1980s, empirical studies of acquisition in the generative framework began to routinely invoke the poverty of the stimulus. This shift is documented in the papers presented at the Boston University Conference on Language Development, among other historical records. Since the BU conference’s inception in 1976, this large annual scholarly meeting has showcased

children are exposed are more well-formed than many generativists assumed. Discussion of whether or not natural speech contains significant anomalies has sometimes been conflated with the “motherese” debate, that is, with the question of how to evaluate evidence that adults tailor their speech in ways that are taken to optimize its value as input to learners. Some scholars (famously, Brown 1977: 20; see also Ingram 1989: 223) credited work like that of Snow as having reduced the force of any argument for the poverty of the stimulus built on assertions of the poor quality of data to which children are exposed. On the other hand, Wexler and Culicover (1980: 60–84) and Lightfoot (1982: 15–24) argued in the early 1980s that the degeneracy of the input is still compelling. In any case, around 1980 the center of debate about the poverty of the stimulus shifted away from this issue.

generative research on language acquisition.⁷ Abstracts for papers presented at the conference from the 1970s through the early 1980s reveal occasional problemization of acquisition in ways that implicate what we now call the poverty of the stimulus. But even in work that was evidently generative, the poverty of the stimulus does not have a consistent presence. Then at the 1984 BU conference, three papers appeared which explicitly invoked the poverty of the stimulus, the learnability problem, or the logical problem of language acquisition. (One of those papers, by Crain and Nakayama, was an embryonic version of their article published in 1987.) Moreover, four or five other papers read at the conference that same year were manifestly built around similar premises without actually employing any of those terms.⁸ From 1984 onwards, numerous studies presented at the BU conference, as at other venues, have incorporated the notion of the poverty of the stimulus.

Much of this work resembles Crain and Nakayama's (1987) research in that it investigates whether learners exhibit the kind of knowledge of language which is purported to be unobtainable by induction from the input. Sometimes the failure of input to inform learners about the linguistic feature in question is demonstrated. Sometimes that failure is simply assumed, on the grounds that no obvious source can be identified. There is enough volume of such research for it to be classified into diverse sub-genres, some of which have had a sustained presence at the BU conference (as elsewhere) for multiple years: research on dative verbs; on binding and anaphoric relations; on argument structure; on syntactic movement. These topics had, of course, been addressed in earlier work without reference to the notion of the poverty of the stimulus. But beginning around 1984, research into binding, dative verbs, and so forth which was predicated on a concept of the poverty of the stimulus forms a recognizable natural class with a common theoretical basis. An example of the extent of penetration of the concept is a paper presented at the conference in 1997 by Dekydtspotter et al.⁹ This study investigates evidence that English-speaking learners of French come to control certain subtle properties of the interpretation of French quantifiers like *beaucoup* 'much, many' and *peu* 'little, few.' Dekydtspotter et al. argue step-by-step against the possibility that either child first language learners or adults acquiring French non-natively can arrive at the relevant grammar solely on the basis of input. What makes their paper espe-

7. Research on language learning in other frameworks has also been well represented at the BU conference. See Thomas (2001) for historical review.

8. All these judgments are based on the abstracts for presented papers as published in the annual Conference Handbooks. Naturally, the varied relationships which abstracts can hold with respect to the contents of actual presentations render these data only approximate. Still, the abrupt eruption in 1984 of work which self-consciously acknowledged the poverty of the stimulus is striking.

9. See Dekydtspotter et al. (2001).

cially interesting is – as the authors recognize – the remoteness of any plausible means by which learners might acquire these complex facts from observation of language use. Work in this vein brings home the salience of the poverty of the stimulus at this stage in the history of generative linguistics.

A second noteworthy event in the recent development of the concept of the poverty of the stimulus is that Wexler (1991) and Schwartz and Sprouse (2000) have asserted for it a methodological role. Both these articles make the claim that one can exploit the concept to help determine which features of a language will, under close examination, lead to theoretically rewarding research. The logic is that if no model for feature X in the input can be found to be commensurate with the richness of speakers’ demonstrated knowledge of X, then investigation of X is likely to lead to insight into the language faculty. This proposal has not been much discussed, but seems to me to represent a significant innovation in the status of the poverty of the stimulus. If it were to be fully integrated into the practice of generative linguists, it might open up new areas of research, or provide a new parallax on familiar topics. It might also have the good effect of focusing attention more sharply on what counts as poverty with respect to a particular stimulus. That is to say, if more research were to be initiated out of scrutiny of the relationship between input and knowledge, generativists might come to examine a broader array of potential sources of informativeness about that input. This might have the good effect of satisfying critics who have complained that, in asserting that particular features of language cannot be acquired by exposure to ambient data, generative research routinely takes into account too narrow a range of kinds of input.

A third recent development is the further progress of a trend established in the early 1980s, namely the re-centering of the concept of the poverty of the stimulus on the third feature of Hornstein and Lightfoot’s tri-partite analysis, what Pullum and Scholz call “stimulus absence.” That is to say, the claim that input to a learner contains no evidence for critical aspects of that learner’s eventual competence has become more and more clearly marked as the heart of the learnability problem, eclipsing both degeneracy and finiteness. On this point it is instructive to compare two books written 17 years apart for similar readerships by the same author, David Lightfoot (1982, 1999). In the earlier text, Lightfoot presented the three prongs of the argument for the poverty of the stimulus in their usual order, although he prioritized the third one, absence of salient evidence, as “the crucial deficiency” (1982: 17) relative to degeneracy and finiteness. But in 1999, Lightfoot first illustrated the concept of the poverty of the stimulus with reference to the claim that children know the grammar of pronouns and of auxiliary contraction although they “have no data which will show them that *is* may not be reduced in some contexts [e.g., in **Kim is happier than Tim’s*], and they have no data showing them that *him* may not refer to *Jay* [in *Jay hurt him*]]” (1999: 51). Only ten pages later does Lightfoot

advert to finiteness and degeneracy (pp. 60–61) as corroborating the absence-of-stimulus property, clearly marking the latter as the uniquely “crucial” and “fundamental” (p. 61) issue. All three classical parts of the argument are still intact in Lightfoot (1999), but the stature of the third has grown, and it has leapfrogged over the other two.¹⁰

This, then, is a sketch of the history to date of the concept of the poverty of the stimulus. After a slow emergence, the idea has moved steadily into prominence in generative linguistics, shifting somewhat in its emphases along the way. It has gradually been knit more and more closely into both empirical study of language acquisition and theoretical work in the field.

3. Nomenclature of the poverty of the stimulus

One intriguing property of “the poverty of the stimulus” is its participation in a web of related terms. As we have seen, the central phenomenon to be explained has been variously identified as “the projection problem,” “the logical problem of language acquisition,” “Plato’s problem,” “the learnability problem,” and “the underdetermination problem.” The principal evidence for the reality of that phenomenon has been referred to as “the poverty of the stimulus,” “the deficiency of the data (or stimulus),” and “the deductive gap.” It is revealing to compare this constellation of expressions with the terminological stability of, say, “Universal Grammar.” Since that term first came into circulation in the early 1600s (Padley 1976: 157), its referent has undergone many radical revisions and metamorphoses, while the label itself has held constant. Thus the expression “Universal Grammar” has been sustained while its meaning has shifted again and again. With respect to “the poverty of the stimulus” and its kin, a different relationship between word and meaning prevails: in this case, one might ask why such a proliferation of terms exists, and what their relationships are with each other.

Some writers seem to employ the whole family of expressions as rough synonyms, although each of these terms stimulates the imagination differently and provides its own insight into their central referential domain. When one examines these terms individually, one feature they have in common is that in many cases the relationship of word to referent seems curiously disturbed or incongruous, when viewed within the context of generative grammar. Take, for example, “the projection problem.” For Peters (1972), the expression represented both the linguist’s and the child’s jobs, which he saw as parallel. But the term privileges the linguist’s point of view, since children face no apparent

10. The rhetoric of a third text by Lightfoot (1989: 322–323) seems to split the difference between his presentation of the poverty of the stimulus in 1982 and that in 1999.

“problem” in learning language, at least not by the light of generative grammar. Linguists struggle to figure out the properties of a grammar, but a child merely “grows” it. Thus although generative theory has abandoned representation of the child as a “little linguist,” it retains terminology which seems to implicate that notion.

An additional difficulty in the expression “projection problem” resides in the meaning of the verb “project.” In coining that phrase, Peters (1972: 185) self-consciously extrapolated on the usage of Chomsky (1957: 15), who had written that “Any grammar of a language will *project* the finite and accidental corpus of observed utterances to a set (presumably infinite) of grammatical utterances.” Chomsky incorporates in this passage the usual centrifugal vector of the meaning of the verb “project,” that is, movement away from a source (i.e. the grammar, via the input) to its manifestation (i.e. the infinite number of utterances that can be produced). But Peters inverts the conventional sense of the term: his “projection problem” is the problem of arriving at the grammar out of which the language is generated. That is, it constitutes a centripetal movement from manifestation back to source. In quite a different context, Otero (1995) has experimented with the term “retrojection,” which might have been better suited to Peters’ intentions. But until one adjusts one’s understanding of the term “projection” to accommodate the sense in which Peters employs it, his usage seems at least infelicitous. At worst, it may support misconstrual of the relationships which generative grammar posits between input and grammatical knowledge.

The expression “the logical problem of language acquisition” may mislead as well. Insofar as it is taken to name what a theorist confronts, it seems apt. But the term is often applied to the circumstances of the language acquirer. To do so invites misunderstanding, because “the logical problem of language acquisition” not only inherits the anomalous term “problem” but also employs the curious locution “logical” which is surely not the basis on which children learn language. Because the term empathizes with the linguist, not the child, it can be extended to refer to the child’s experience only indirectly. Thus it seems incongruent for generativists to write or speak of the child learner as facing or overcoming a logical problem of language acquisition, even though this is a fairly common practice.¹¹

The term “the poverty of the stimulus” also contains buried assumptions which seemingly run against the current of generative theory. Chomsky (1959)

11. See, for example Goodluck (1991: 3). Pullum and Scholz’s Footnote 8 acknowledges a related difficulty with the term “the logical problem of language acquisition.”

famously challenged the adequacy of depicting language as a “stimulus.” By the light of these objections, it would seem counter-cultural for generativists to represent input to a learner as a stimulus in any usual sense of the word. Worse, from a generative perspective input to a child is not really “impoverished.” Rather, it contains everything needed to construct a grammar. “Everything needed” happens to be not very much; but to characterize nature’s bare economy as a kind of “poverty” is to imply that one might otherwise expect input to a learner to be effusive in quantity and demonstrative or explicit in content in ways which exactly contradict its representation in generative grammar. Thus the expression “the poverty of the stimulus” appears to have been coined from a point of view which is inimical to the theory which has promoted it.

The least popular member of the family of terms, Baker’s “deductive gap” may come closer to capturing the phenomenon from an authentically generativist perspective, by assuming the viewpoint of the child learner. What a child does is derive a grammar through the input data, not wrestle with a “problem” or solve a “logical” conundrum. The propriety of Baker’s locution improves if “deductive” can be used in a sense which minimizes its connotations of rational, self-conscious inference-making. Still, the word “gap” contains a dissonant note. The language faculty isn’t appropriately described as filling a gap except from the perspective of an input-driven theory of language learning, precisely the kind of theory the term was developed to argue against. From a generative point of view, no gap is involved: a child readily encounters adequate information about the features of the language being acquired. Little such information is necessary, but what is available suffices.

There exists, then, a lexicon created by generative linguists for talking about language acquisition whose entries may in different ways prejudice an accurate understanding of what these terms are designed to refer to. One might object that names for concepts are only labels, and concepts can certainly survive intact despite being mislabeled. Still, I would speculate that the pervasive incongruity between concept and expression may be related to the proliferation of generativist terms for depicting language learning. Perhaps novel expressions keep emerging because the existing ones aren’t fully congenial.

At the risk of intolerably over-crowding semiotic space, I would propose some new coinages, crafted as an exercise in exploring what it might sound like to try to talk about language learning from a more consistently generativist point of view. One approach would be to locate terms which blend the senses of the words “sparse” or “slight” with the senses of the words “adequacy” or “sufficiency.” This is not a combination of meanings with which the English lexicon is seemingly well-endowed. But perhaps the quality of input in relation to competence might somehow be represented as characterized by “thrift” (rather than “poverty,” or the negative space implied by a “gap”), particularly if

the existing etymological link between “thrift” in its sense of economy or good husbandry, and the verb “thrive” could be revived.¹²

In a different approach, Lightfoot (1989: 321) referred to “the discrepancy between experience and eventual capacity,” a phrase which has the advantage that it distinguishes input from knowledge without attributing inadequacy or insufficiency to the former. One might build on the merits of Lightfoot’s locution (and, arguably, suppress the faint presence of the notion of a “gap” inherent in the word “discrepancy”) in an expression like “the incommensurability of evidence to knowledge.” Further, one might invert the implied comparison into “the incommensurability of knowledge to evidence.” This latter expression has the virtue of foregrounding knowledge, or – to use the terms of Chomsky (1959) – the learner’s “inner structure,” relative to the “external factors” of input data.

Finally, it is worth considering a neologism employed by Crain (2001), which suggests a different kind of dissatisfaction with current terminology. Crain rejected the representation of language acquisition as a process whereby children deduce a grammar from the input data. Instead, he portrayed it as a phenomenon wherein, in his words, “data drives children through linguistic space,” a space defined by the contents of Universal Grammar. Crain’s metaphor entails a reduction of the agency of a child learner to virtually nil. In this sense it culminates a trend away from depicting learners as actively engaged in grammar construction. One step in that trend took place in the early 1980s, with the abandonment of the notion of a learner as a “little linguist” (a notion which, I have argued, is subsumed in Peters’ exposition of the projection problem). Ten years later a characterization of the child as one who “sets parameters” gained currency. That expression would seem to diminish the scope of the activities of language learners somewhat, but it still places the child – syntactically as well as conceptually – in the position of agent. With the erosion of the parameter-setting model of language acquisition initiated by Chomsky (1995), Crain’s representation of children as “[driven] through linguistic space” by input may indicate the present direction of generativist conceptualization of language acquisition. If Crain’s expression is accepted and taken up by others, it may signal a shift in how the relationship between input and knowledge is perceived.

In these or other ways, it is possible to imagine a renewed vocabulary for talking about language acquisition which might evade incongruity, better reflect conceptual shifts, or otherwise tighten up the coordination of sense and reference. It is unclear, of course, whether adoption of new expressions engi-

12. I thank Robert Chibka for conversation about the meanings of “thrift.” See the entry for “thrift” in the *Oxford English Dictionary*, and Chibka (1999).

neered to avoid the inadequacies of earlier terminology would make a substantive difference. Then again, it is easy to underestimate the power of language.

4. The concept of the poverty of the stimulus employed, misemployed, and ignored

To revert now to conventional terminology, conversation about the logical problem of language acquisition between generativist and non-generativist theorists sometimes reveals misunderstanding and miscommunication. There is evidence for various kinds of lapses. One is that few linguists outside the generativist camp recognize the importance to generative theory of how it conceives of language acquisition. Botha (1985, 1989) may be an exception, but many scholars of the history and philosophy of linguistics do not acknowledge the salience of discourse about language learning. Or if they do, they either criticize it in terms so alien to the conceptual language of generativism that that critique is not felt, or they reject the problemization of language acquisition without addressing the rationale for its existence. Koerner (1976), for example, reviews nineteenth and twentieth century linguistics, including generativism, without mentioning any role for language acquisition in Chomsky's work. Koerner may have written in the interval before the significance of Peters' projection problem had been made conspicuous. But since that time, other critics of the Chomskyan framework have downplayed the centrality of the relationship between input and competence in generative theory. Harris (1989) dismisses Lightfoot's (1989) presentation of the logical problem of language acquisition as built on tautological reasoning and evidence assumed *a priori*. But to do so only leaves a generativist readership asking how else to account for children's grammatical knowledge of, say, reciprocals or *that*-trace effects. Taylor (1992) illustrates how one might survey Chomskyan linguistics yet fail to be impressed by what it presents as its own distinctive insight. In a passage in which he points out certain assumptions about the nature of language shared by generativism and seventeenth-century naturalism, Taylor (1992: 67–68) cites Chomsky's concept of the poverty of the stimulus in passing. But he does so without either integrating it into his comparison of Chomsky with Condillac and Locke, or refuting it, or offering an alternative. Andresen (1990: 250) stands out among historians of linguistics in that she brings attention to the necessity of accounting for language acquisition. She calls it "[t]he most vexing problem" confronting Chomsky's critics. But Andresen's only response is to wonder, citing work by Geoffrey Sampson, whether Parallel Distributed Processing might model how language is learned without "inductive leap[s]." That response seems not to take seriously the magnitude of the void that would be introduced if children were to be allowed no inductive leaps as they learn a

language. In the context in which Andresen is writing, she does not make herself responsible for a detailed proposal about how to solve that “most vexing problem.” Still, the ease with which she hands off the matter reveals how little it has engaged her.

In these ways, the logical problem of language acquisition is sometimes viewed skeptically from a distance, in a manner which prescind from fully analyzing it or articulating an alternative. This is one kind of evidence for miscommunication about the concept. Moreover, the logical problem of language acquisition has sometimes been challenged in ways which do not seem to fully grasp its nature. For example, the “motherese” debate of the 1970s was for a period believed to have vitiated assertions that competence is underdetermined by input. But in retrospect, it is not at all clear that this belief is warranted. Whether or not caregivers adopt a special register when addressing children, and, if so, to what extent that register could be described as “simpler, more redundant, and less confusing than normal adult speech” (Snow 1972: 549) are interesting questions. But however they are answered, it remains to be demonstrated that that register provides children with access to information about grammatical properties which, arguably, are otherwise not present in the input.

Another instance of the poverty of the stimulus being debated across what seem to be widely separated notions of what it consists of appears in Pullum (1996), and is elaborated on in the lead article by Pullum and Scholz. The claim concerns English questions where a matrix-clause auxiliary is extracted across a clause embedded in subject position which contains another auxiliary in situ. As we have seen, Chomsky asserts that children assume a complex, structure-dependent, grammar which recognizes the matrix clause auxiliary as the only one available for movement. This is despite the fact that, according to Chomsky, children rarely if ever are exposed to sentences like *Is the man who is tall ___ in the room?* which would signal that the grammar does not merely move the first auxiliary leftward. Pullum and Scholz claim that Chomsky’s point is undone by their collection of sentences (culled from various corpora) that exhibit the structure in question, sentences like *Is what I’m doing ___ in the shareholders’ best interest?* Chomsky’s point, however, balances not so much on the scarcity of models of structure dependence as on whether children’s grammars rule out sentences which are not attested at all, namely ungrammatically structure-independent ones. The closest relevant empirical study, Crain and Nakayama (1987), only showed that children don’t produce structure-independent questions; it didn’t prove that children reject **Is the man who ___ tall is in the room?* as ungrammatical. However, what Crain and Nakayama (1987) don’t prove with respect to structure dependence, Crain (1991) proved for Strong Crossover and other exemplars of the poverty of the stimulus. Regrettably, Pullum (1996) doesn’t cite that work. Pullum and Scholz do refer to it, but without addressing Crain’s central point, namely his claim to

have demonstrated children's knowledge of what is inadmissible, under the assumption that what is inadmissible is not signaled by the properties of the input.¹³ That central point doesn't – despite the terms in which it is conventionally labeled – rest on the "poverty" of a "stimulus." Rather, it rests on the incommensurability of knowledge (in Chomsky's data, knowledge that **Is the man who __ tall is in the room?* is ungrammatical) and experience (namely, the experience that questions are sometimes formed with a first auxiliary moving leftward, and sometimes with a subsequent one doing so).

There are other scholarly exchanges about language acquisition which seemingly misfire due to apparent misconstrual of the concept of the poverty of the stimulus. In the 1980s, Geoffrey Sampson and Stephen Stich debated the epistemological status of the logical problem of language acquisition. In a capsule, Sampson (1980) asserted that, if children can't learn a language strictly from input, then how is it that linguists can determine, from that same input, what the language's actual grammar is? Stich (1981: 162) responded that linguists resort to intuitive judgments of grammaticality and psycholinguistic evidence which children lack. About psycholinguistic evidence, Sampson (1997: 44–45) retorted that linguists don't actually use it, even when available. About speakers' intuitions, Sampson would exclude it because – if I follow his argument – to admit those intuitions as relevant is to accept what is disputed, the existence of innate knowledge of language. I may have deformed this dispute by condensing it, but if, indeed, it rests on a question of whether speakers' intuitions about *Flying planes* or *eager* versus *easy to please* are or are not within the scope of what a theory of language has to explain, then there seems to be not enough common ground between Sampson and Stich for their debate to be productive.

One final example of sub-optimal communication about the poverty of the stimulus resides in evidence that generative linguists lose opportunities to push back misunderstanding. Pullum (1996: 510) focuses on structure-dependence because, in his words, among evidence supporting the poverty of the stimulus, it alone is "innocent of semantic entanglements." Pullum asserts that the grammars of binding or Control could be construed from the meanings of sentences, subverting their support for the poverty of the stimulus. As far as I know, no generativist has directly responded to Pullum's claim. It would require broad, patient, imaginative, analyses of various grammatical phenomena and their distributions, and a generous attempt to find any conceivable means by which input might inform learners about forms and meanings. So far, not enough work

13. With reference to Pullum (1996), Pullum and Scholz (Footnote 10) find among generativists a failure to take seriously what their opponents consider to be essential counterevidence. But in the case of Pullum and Scholz's treatment of Crain (1991), the same stream seems to flow in the opposite direction.

like this has been done. Generativists are quick to dismiss the plausibility of its success, without actually undertaking it. This exasperates their critics. The poverty of the stimulus retains its status as a kind of touchstone of generative orthodoxy, arguably undermined within generativism by being incongruously labeled, and sometimes either ignored or poorly understood without. Real conversation suffers. It is to be hoped that exchanges like the ones contained in this issue of *The Linguistic Review* will succeed in modeling a more informed dialogue about the relationship of linguistic knowledge to evidence.

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