
The Role of Input Revisited: Nativist versus Usage-Based Models

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This article examines the role of input in two contrasting theories of language acquisition: nativist (UG) theory and the usage-based (emergentist) approach. Although extensive treatments of input are available for first language acquisition (cf. Gathercole & Hoff, 2007), such research rarely incorporates findings from second language acquisition. Accordingly, this paper examines a range of linguistic phenomena from both first and second language contexts (e.g., *yes-no* question formation, constraints on *want-to* contraction) in order to illustrate how each theory might explain their acquisition. The discussion of input presented here addresses various constructs, including the problem of the poverty of the stimulus, the lack of negative evidence, the role of indirect (missing) evidence, recovery from overgeneralization, and frequency effects. The article concludes with a reappraisal of the poverty of the stimulus problem in SLA from a usage-based perspective.

Recent publications in the field of second language acquisition (SLA) show a marked trend towards usage-based approaches to describe the development of linguistic knowledge (cf. Robinson & Ellis, 2008). Since usage-based models are based on theories of Cognitive-Functional linguistics (Bybee, 1995; Croft, 2000; Goldberg, 1995; Langacker, 1987), they are compatible with a range of specific proposals including, but not limited to, frequency-based (Ellis, 2002), connectionist (Elman, 2005), and emergentist approaches (MacWhinney, 1999; O'Grady, 2003, 2008). The central assumption made by all researchers operating from a usage-based perspective is that "all linguistic knowledge—however abstract it may ultimately become—derives in the first instance from the comprehension and production of specific utterances on specific occasions of use" (Tomasello, 2000b: 237-238). Accordingly, the usage-based approach, in opposition to linguistic nativism, does not postulate an innate grammatical system (i.e., Universal Grammar) to explain the eventual outcome of successful language acquisition.

This paper focuses specifically on the question of input and how it is characterized in usage-based and nativist approaches to language acquisition. Input is defined here as the "raw data" (Chaudron, 1985) or, more commonly, the "positive evidence" available to learners. Simply put, input is the language in the learner's environment, which can be objectively described in terms of factors such as frequency, consistency, and complexity. Input should be distinguished from intake, which refers to portions of the input that have been apperceived and further processed (Gass, 1997: 23). The goal of this article is not to present an exhaustive description of usage-based and Universal Grammar (UG) theories, nor to examine all the major differences between them. Such an undertaking is beyond the scope of this paper, and furthermore, there is a large body of literature that addresses these theoretical differences (cf. Gregg, 2003; O'Grady, 2008a). Instead, the goal is to

examine the role of input in these two competing approaches by considering specific properties of language that are believed to pose learnability problems.

A focus on input is justified because it is arguably the most important construct in SLA (see the recent volume by Piske & Young-Scholten, 2008). Yet it remains elusive. Carroll (2001:1) sees input as “one of the most under-researched and under-theorized aspects of second language acquisition.” Moreover, the key supporting arguments for UG (e.g., the poverty of the stimulus, the lack of negative evidence) make important assumptions about the role of input. Likewise, usage-based approaches, as the name suggests, are input-dependent (O’Grady, 2008b) or input-driven (Harrington & Dennis, 2002), and regularly make claims about how acquisition mirrors input conditions. Thus, both nativist and usage-based models face a common challenge: each must grapple with the problem of how the primary linguistic data, that is, the input, affects acquisition and to what degree.

By conducting an in-depth analysis of the role of input, I hope to establish connections between SLA and other fields of study, especially child language (L1) acquisition. It is well known, for example, that the concept of poverty of the stimulus was initially proposed for L1 acquisition (Chomsky, 1965, 1980) and continues to be an ongoing source of controversy in cognitive science, as evidenced by publications in major journals such as *Cognition* (cf. Lidz, Waxman, & Freedman, 2003; Reiger & Gahl, 2004). Likewise, the construct of item-based learning, central to the usage-based approach, was developed to account for patterns in L1 acquisition. For this reason, any meaningful discussion of these concepts in SLA must necessarily draw on insights from fields outside of SLA.

The paper begins with a synthesis of the major assumptions about input in UG theory and how these have played out in both L1 and L2 acquisition contexts. The usage-based perspective, and relevant empirical evidence, is presented as an alternative to linguistic nativism. Examples of specific grammatical structures that have been signaled out as constituting a learnability problem (e.g., auxiliary inversion, pronoun interpretation, and the *want-to* contraction) are used to illustrate the contrast between these approaches. The article concludes with a proposal to reframe the poverty of the stimulus problem in SLA from a usage-based perspective.

NATIVIST ASSUMPTIONS ABOUT INPUT

Poverty of the stimulus

Researchers that subscribe to a UG approach agree that some properties of language are “too abstract, subtle, and complex to be acquired in the absence of innate and specifically linguistic constraints on grammar” (White, 2003: 20). Simply put, input alone is not enough. Nevertheless, learners acquire those subtle and complex properties of the grammar, as reflected by their intuitive judgments and correct production. Thus, learners’ grammatical competence eventually surpasses the information available in the input; in other words, the input underdetermines the adult grammar.

This observation, also known as the logical problem of acquisition or poverty of the stimulus (POS), is the *raison d’être* of nativist theories of language acquisition. It is originally ascribed to Chomsky (1965), but the hypothesis (in various forms) continues to be a

hallmark of nativist theory (Hornstein & Lightfoot, 1981; among others). In the nativist tradition, the poverty of the stimulus applies to two different situations: (1) cases in which the input seems to be ambiguous, potentially leading the learner to overgeneralize incorrectly (see examples of locative alternations in next section), and (2) cases in which the input is lacking, that is, it simply does not provide enough evidence of a particular grammatical property.¹ The situation in (2) has been hypothesized to exist for a limited number of properties of English, including plural compound nouns (Gordon, 1986), auxiliary sequences (Kimball, 1973), anaphoric *one* (Lidz et al., 2003), and *yes-no* question formation. The last of these, question formation, is perhaps the most widely cited example of poverty of the stimulus phenomena, both by nativists and non-nativists alike (cf. Cook, 1991, 2003; Lightfoot, 1991; Sampson, 2005; among others.)

It seems that English *yes-no* questions are formed by a simple rule of inversion: the auxiliary verb is moved to the beginning of the sentence. For example, the declarative sentence in (1) is posed as a question in (2); an underscore indicates the position from which the main clause auxiliary is moved.

- (1) The paper is finished.
 (2) Is the paper ___ finished?

However, the situation is complicated somewhat by the presence of a subject containing a finite relative clause, as illustrated in (3) and (4).

- (3) The paper that is on your desk is finished.
 (4) Is the paper that is on your desk ____ finished?

The key observation here, made initially by Chomsky (1965, 1980), is that the question in (4) can only be produced by a *structure-dependent* rule; the fronted element is the verb from the main clause. An alternative hypothesis, based on linear word order, would be to front the first verb, resulting in the ungrammatical string in (5):

- (5) *Is the paper that ____ on your desk is finished?

Note that questions like (2) do not discriminate between the two hypotheses, the linear one (incorrect) and the structure-dependent one (correct). Exposure to the input is not enough for the child to deduce the underlying structure of these surface strings (Legate & Yang, 2002). Crucially, nativists claim that questions with finite relative clauses like (4), which would provide evidence of structure dependence, are exceedingly rare in the input. Chomsky affirms, “A person might go through much or all of his life without ever having been exposed to the relevant evidence, but he will nevertheless unerringly employ [the structure-dependent] generalization on the first occasion (Chomsky, in Piattelli-Palmarini, 1980: 40).

The second part of Chomsky’s statement—that English speakers do not produce deviant questions like (5)—has been corroborated by experimental research. Crain and Nakamaya (1987) devised an elicited production task in which children were given prompts like “Ask Jabba if the boy who is watching Mickey Mouse is happy.” The results reveal no errors stemming from a linear hypothesis (cf. example 5). From the nativist per-

spective, the results of Crain and Nakamaya show that English-speaking children are “parsing sentences into structurally organized phrases, and fronting the auxiliary that follows *the subject NP*” (Legate and Yang, 2002: 153, emphasis original). Structure dependency is one example of a UG principle that limits the number of plausible grammatical hypotheses children must entertain, allowing them to arrive at the correct generalization with minimal help from the input.²

If children acquire linguistic structures that are missing or extremely rare in the input, then learning cannot be purely experience-based. Indeed, the POS hypothesis is a powerful argument for innateness because it reasons, “if you know X, and X is underdetermined by the learning experience (i.e., the input), then the knowledge of X must be innate” (Legate & Yang, 2002: 152). Inborn linguistic constraints (in the form of UG) facilitate acquisition by constraining the form of natural language grammars, allowing normally developing children to acquire language uniformly, quickly, and successfully (Hawkins, 2001).

Lack of negative evidence

UG supporters cite the lack of negative evidence as another facet of the poverty of the stimulus problem.³ It is assumed that input lacks information regarding ungrammaticality, which would be necessary to rule out incorrect hypotheses in the absence of innate constraints. Schwartz (1999: 637) explains the problem in this way:

Since there are *no* exemplars of ungrammatical utterances with a metaphorical asterisk attached, then there are likewise no data that can serve as the basis for inducing ungrammaticality (emphasis original).

Schwartz concludes that knowledge of ungrammaticality must be rooted in the child’s mind (in the form of innate constraints and principles of UG) rather than resulting from an external source (i.e., the input). This specific rendering of the poverty of the stimulus problem rests on a critical assumption: that the learner, when presented with positive evidence (input) that is consistent with multiple hypotheses, will not be able to discriminate among them.

In his most recent popular book, Pinker (2007) demonstrates this problem by describing the peculiarities of English locative alternations (e.g., *load the wagon with hay / load hay onto the wagon*). Many verbs (e.g., *load, spray, splash*) can appear in a content-locative structure (*load hay onto the wagon*) as well as in the container-locative structure (*load the wagon with hay*). Pinker (2007: 42) concludes that the situation “presents us with a paradox of a child seeming to learn the unlearnable.” What he is referring to is not the alternation itself, but the fact that some verbs can alternate (*load*), while others cannot appear in a container-locative (**She poured the glass with water*), and yet another subclass resists the content-locative option (**She covered an afghan onto the bed*). It would be tempting for children to assume that all verbs of ‘moving something somewhere’ can alternate. For Pinker, the constraints on locative alternations illustrate the problem of induction: what prevents speakers from making overly general conclusions about a construction in the absence of negative evidence?

One possibility, entertained by Chomsky (1981), is that learners might make use of indirect negative evidence, that is, noting patterns that are absent in the input. For example, the child learning English comes to know that **pour the glass with water* is impossible because he/she never hears it in the input and eventually discards it as a possibility. In other words, missing evidence could be evidence. Nevertheless, Pinker (2007: 41) discounts indirect negative evidence on the grounds that “there are an infinite number of perfectly grammatical forms that they [children] also don’t hear, and they can’t very well exclude all of them or they would be confined to parrothood.” As we will see shortly, the role of missing evidence is crucial for the usage-based perspective (cf. Regier & Gahl, 2004).

Second language acquisition

Up to this point, we have examined a fundamental assumption regarding input in the UG approach: that input underdetermines an individual’s eventual knowledge of grammar for one of two reasons: a) it does not contain sufficient data adequate to the task of learning subtle aspects of language (e.g., structure dependence) and b) it lacks negative evidence that would make it possible to recover from overgeneralizations (e.g., applying the locative alternation indiscriminately). Crucially, these assumptions originated from theorizing about native language acquisition; their application to SLA requires reconsideration and reappraisal given the obvious differences in learning context.

Even among nativists, the role of UG is markedly less certain in second language acquisition. As Hawkins (2001: 354) notes, “theoretical linguists generally have not been convinced that L2 grammars are UG-constrained.” This sentiment is echoed by Schwartz (1999: 647), who suggested that “interlanguage just might not be a ‘natural language’ and that ‘what is true about language’ may well not be true about (adult) interlanguage.” The solution for Schwartz is to investigate whether the SLA exhibits poverty of the stimulus phenomena (cf. Schwartz & Sprouse, 2000). However, establishing POS in the L2 context is more complicated because of mediating factors such as direct instruction and native language knowledge. White (2003: 23) explains that the following two conditions must hold in order to establish a genuine case of POS in SLA:

- (a) The property must be underdetermined by the L2 input. This includes lack of direct instruction about the property in classroom contexts.
- (b) There must be an L1-L2 difference in how the property is manifested. This would exclude the possibility of transfer from the native language.

Some SLA researchers have sought out phenomena that conform to the limitations in (a) and (b) in order to demonstrate that L2 learners, like L1 learners, end up with subtle knowledge of grammar that goes beyond the information in the input. One phenomenon that has attracted the attention of UG researchers is the Overt Pronoun Constraint (OPC) (Montalbetti, 1984). The OPC dictates the coreference possibilities between the subject (null or overt) or the lower clause and its antecedent in the main clause. Consider the Spanish example in (6):

- (6) *Nadie cree que él aprobará el examen.*
 Nobody believes that he will pass the test.

In Spanish, the overt subject (*él*) of the subordinate clause cannot refer to the quantifier *nadie* in the main clause. In other words, the bound interpretation is excluded; instead, the pronoun *él* must refer to a particular individual in the discourse (i.e., the referential interpretation). This follows directly from the OPC, which states that, in null subject languages, an overt pronoun cannot have a quantified expression as its antecedent. For White (2003), this phenomenon constitutes “a clear poverty-of-the-stimulus situation,” which has motivated research in L2 Japanese (Kanno, 1997) and L2 Spanish (Pérez-Leroux & Glass, 1999). Specifically in the case of L2 Spanish, Hawkins (2008) points out that input is of little help because the learner will encounter overt pronouns (e.g., *él*) with quantified antecedents when the pronoun is not in subject position.⁴ Likewise, the learner’s L1 (if it is an overt argument language like English) does not provide the relevant clues since the subject pronoun in the English equivalent of (6) can refer to the quantified antecedent. Finally, Hawkins argues that this phenomenon is not generally taught in classrooms, nor are Spanish language teachers widely aware of it. Together, these conditions suggest that pronoun interpretation with quantified expressions (when the L1/L2 combination involves overt subject/null subject languages) meets the standard for POS in SLA.

Another assumed case of POS in second language acquisition is split intransitivity, that is, the unaccusative/unergative distinction. Montrul (2005: 1160) explains why unaccusativity is a classic poverty of the stimulus problem: “On the surface, all intransitive verbs look alike: they have one argument. How does the learner find out, solely from positive evidence, that these two verb classes have different underlying representations?” Furthermore, in SLA, the distinction is “*never* taught in language classrooms and is underrepresented in language teaching materials (Montrul, 2004: 240, emphasis original). It is important to note that although the unaccusative/unergative distinction is believed to be universal, there are language-specific properties or “reflexes” of unaccusativity that have to be learned from exposure to input. For example, Italian and French have different perfect auxiliaries that correspond to each verb class (cf. Sorace, 2000) while Spanish does not.⁵ Therefore, researchers working within a UG framework assume that L2 learners have knowledge of the unaccusative/unergative distinction from their native language, but they must learn the language-specific syntactic and morphological manifestations of the distinction.

Additional properties that have been investigated under the rubric of POS phenomena in SLA include Japanese passives (Hara, 2007), Spanish eventive and stative passives (Bruhn de Garavito & Valenzuela, 2008), French adjectival restrictions of *wh*-quantifiers (Dekydtspotter & Sprouse, 2001), and Spanish aspectual distinctions (Montrul & Slabakova, 2003). Interestingly, the nature of the POS argument put forth in these studies is different from that of previous work, especially the original POS argument for structure-dependency. The argument no longer hinges on the absence of evidence per se, but rather on input that does not directly exemplify the property at hand. Hara’s (2007: 420) definition of the POS problem is a case in point: “Learning situations wherein information necessary for acquisition cannot be *reliably* extracted from the input” (emphasis added). He argues that the Japanese *ni* direct passive is a prime example of POS because of its incompatibility with non-perfective readings when the subject is

inanimate.⁶ To justify treating this as a case of POS, Hara (2007: 443) argues that the restriction of the *ni* direct passive to perfective readings cannot be “directly inferred from the input.” Crucially, the POS argument espoused by Hara (2007) never claims that the construction itself (the *ni* direct passive) is rare or infrequent in the input; instead, the focus is on restrictions that are assumed to be too obscure to be inferred by the learner.

A similar argument is put forth by Bruhn de Garavito and Valenzuela (2008) in their work on Spanish eventive and stative passives, a contrast that is manifested through copula choice (*ser* for eventive and *estar* for stative passives). In the UG approach, the surface contrast in this case stems from underlying aspectual properties of the two copulas. For Bruhn de Garavito and Valenzuela (2008: 323), “There is no guarantee that the input will provide enough evidence as to the nature of the two copulas.” Learners will be sensitive to certain restrictions (e.g., subjects of eventive passives can be interpreted as generic) only if they notice the aspectual properties of the copulas. If the studies mentioned here are representative of the UG approach to SLA, then the nature of the POS argument has changed. Researchers are routinely assuming that the input is not rich enough even when a given construction is abundant in the input; the “poverty” stems from the lack of overt indicators of underlying, abstract properties.

Summary of input in the UG approach

To summarize, from the UG perspective, input alone does not determine the course and eventual outcome of language acquisition. Linguistic structures involve subtle and complex restrictions, which are oftentimes stated as negative constraints (i.e., what is impossible). Surface properties of language, including linear word order, are deceptive in the sense that they don’t provide clues to underlying representations. Critical properties of language such as pronoun interpretation, split intransitivity, and locative alternations are difficult, if not impossible, to perceive and monitor from the input. Input also lacks negative evidence that is necessary to rule out incorrect hypotheses. However, under normal circumstances, humans will always fully acquire their first language. Second language learners, although not always from the outset, also develop sensitivity to subtle properties of the L2 (Montrul, 2005; Pérez-Leroux & Glass, 1999). This suggests the presence of an innate system that bridges the gap between experience and linguistic competence. From the UG perspective, this innate endowment comes in the form of a domain-specific system of grammatical categories and principles.

Although this section has presented examples of specific linguistic constructions (e.g., English *yes-no* questions), it is worth remembering that nativist theory does not attempt to account for all aspects of linguistic competence. Instead, the concern has always been defining the limits of “core grammar,” that is, the architecture of human language. Core grammar contrasts with the linguistic “periphery,” which consists of all language-specific properties (including the lexicon), and which must be learned via normal processes of learning and memory. A strong form of this distinction was reiterated by Chomsky (1995: 131): “There is only one human language, apart from the lexicon, and language acquisition is in essence a matter of determining lexical idiosyncrasies.” Thus, in the nativist approach, the process of acquisition is fundamentally a matter of linking language-specific properties with an innate universal grammar (cf. Pinker, 1989).

USAGE-BASED ASSUMPTIONS ABOUT INPUT

Richness of the stimulus and indirect negative evidence

Usage-based models provide an alternative account of language acquisition that greatly differs from the UG perspective, particularly with respect to the perceived role of input. Within usage-based theory, input is the driving force of language acquisition and learners have various cognitive (nonlinguistic) tools at their disposal that allow them to abstract regularities from the input. Crucially, there is no poverty of the stimulus problem; in fact, several articles use the term “richness” in their title to make this stance explicit (cf. Reali & Christiansen, 2005; Sampson, 2002). These researchers take the position that input is an observable and measurable entity, and therefore, any assumptions about stimulus poverty must be empirically tested.

Pullum and Scholz (2002) challenged the POS argument by searching corpora of written texts for the structures typically assumed to be too rare in the input for children to learn them (e.g., auxiliary sequences, anaphoric *one*, noun compounds, and inversion of auxiliary verbs). With respect to the inversion of auxiliary verbs—the quintessential structure for POS—Pullum and Scholz found that the *Wall Street Journal* corpus contains some relevant exemplars, but the rate is very low (1%). Clearly, a written corpus targeting adult readers is not necessarily representative of the input young children hear, a limitation that Pullum and Scholz acknowledge. Legate and Yang (2002), in a rebuttal of Pullum and Scholz’s paper, conducted a search of the CHILDES corpus for sentences that might provide sufficient positive evidence. Their results, based on a total of 20,651 questions, indicate zero tokens of *yes-no* questions of the type in (7), and only fourteen exemplars of *wh*-questions as illustrated in (8), which should provide the same type of evidence.⁷ Examples are from Legate and Yang (2002: 157).

(7) Is the boy who is in the corner ____ smiling?

(8) Where’s the little read duck that Nonna sent you?

According to Legate and Yang, since the actual frequency of these critical exemplars is negligible (.068%), there is insufficient evidence for the child to arrive at the correct structure-dependent generalization. Assuming that the incidence of auxiliary inversion with embedded relative clauses represents less than 1% of input, we can conclude that the positive evidence for this structure is indeed meager. MacWhinney (2004: 890) acknowledges this situation: “We can safely say that the positive evidence for this particular structure is seldom encountered in the language addressed to children younger than 5;0.”

However, positive evidence is clearly not the whole story. Reali and Christiansen (2005) argue that the notion of “relevant evidence” must be redefined in order to include indirect statistical information (i.e., indirect negative evidence). In order to test their hypothesis, they trained a simple statistical model on pairs (bigrams) and triples (trigrams) of words from a child-directed corpus. The corpus contained 10,705 sentences and a total of 35,505 words, but most importantly, there were no explicit examples of auxiliary inversion in *yes-no* questions.⁸ In other words, there was an absolute lack of positive evidence for structures like *Is the dog that is on the chair black?* The method employed by Reali and Christiansen consists of breaking down a sentence into chunks

and then calculating their frequency of occurrence in the corpus. For the question, *Is the dog that is on the chair black?*, the bigram model tabulates the frequency of [is the], [the dog], [dog that], [that is], and so on. After training the model using the corpus of child-directed speech, the authors tested how well it could distinguish 100 novel grammatical and ungrammatical sentence pairs such as (9) and (10):

(9) Is the lady who is there eating?

(10) *Is the lady who there is eating?

Their results demonstrate that the bigram and trigram models correctly classified 96% of the novel sentences. The theoretical implications of this finding are of great magnitude because it suggests that children are able to arrive at the structure-dependent generalization by paying attention to the co-occurrence probabilities of sequences of words. As Reali and Christiansen (2005: 1022) conclude, “there is sufficiently rich statistical information available *indirectly* in child-directed speech for making appropriate generalizations about complex AUX questions” (emphasis original).

The results of the Reali and Christiansen (2005) study highlight the importance of recurring sequences of words and the learner’s ability to track co-occurrences. On this view, the correct production of auxiliary-initial questions is not a result of movement at all. This is very similar to the proposal put forth by O’Grady (2008b), in which elements are combined from left to right in a way that satisfies lexical requirements. For O’Grady, ungrammatical *yes-no* questions containing embedded relative clauses (e.g., **Are Americans who rich are happy too?*) are banned because the complex NP is ill-formed. Simply put, the sequence [Americans who rich] is an impossible chunk in English. This is exactly what Reali and Christiansen (2005) showed in their research; their trigram model would recognize this as an impossible sequence because it doesn’t appear in any type of English sentence. Thus, if we accept that *yes-no* questions can be formed without inversion or movement, as O’Grady (2008b) outlines, it eliminates the central problem of determining how children know which auxiliary to “front.” Consequently, the actual input frequency of such questions in child-directed speech is irrelevant; what matters is exposure to a basic property of English: the required presence of a copula to the left of predicate adjectives (e.g., *Americans who are rich*).

Lack of negative evidence

The lack of negative evidence, a recurring theme in UG theory, is also acknowledged by usage-based approaches, but with a focus on the mutually supportive mechanisms that prevent and overcome grammatical overgeneralizations. Indirect negative evidence (discussed in the preceding section) is one mechanism for recovery from overgeneralization, in addition to competition, cue construction, and monitoring (MacWhinney, 2004). Of these four mechanisms, competition is argued to be the “most basic, general, and powerful” (MacWhinney, 2004: 900). Competition occurs when the analogic pressure that produces overgeneralization competes with the rote episodic pressure of forms found in the input. MacWhinney uses the irregular past tense of the verb *to go* to demonstrate how competition works. At some point in development, an English learner will produce the form that is analogous to other verbs in the past tense: **goed*. The

analogous form will compete with the episodic form available in the input. As exposure to the input-supported form increases, the learner will overcome the analogic pressure and the incorrect **goed* will be eliminated. Thus, recovery from overgeneralization is based entirely on the evidence available from the input and the learner's propensity to eliminate forms that lack episodic support. Competition is not limited to morphological forms, but can account for lexical and syntactic phenomena as well (see MacWhinney, 2004 for a complete discussion).

In terms of prevention, the usage-based approach assumes that learners are inherently conservative, a notion that stems from extensive research findings in developmental psycholinguistics (see Tomasello, 2000a for an overview of relevant research). These findings highlight the item-based nature of children's early linguistic productions, especially their use of verbs. For example, Tomasello and Brooks (1998) taught novel verbs to children between the ages of two and three. The verbs were presented in intransitive frames (e.g., *the sock is tammimg*), but the researchers were interested in whether or not the children would be able to generalize the verbs to transitive constructions. Their results clearly indicate that these young children were very poor at generalizing newly learned verbs; they were only able to use a verb transitively if they had heard it used that way. These findings suggest that children's initial verb learning proceeds in a piecemeal fashion; they eventually build up abstract schemas and categories, but only as a result of initial verb-by-verb learning that is dependent on the input they are exposed to.

Learners will also avoid certain overgeneralizations based on the meaning that they have assigned to a given construction. Goldberg and Casenhiser (2008) note that some hypothetical overgeneralization errors are purely formal in nature and can easily be eliminated by the learner on the basis of meaning or function. Consider the resultative construction in English, exemplified in (12) (Goldberg & Casenhiser, 2008: 199).

(11) She hammered the flat metal. [transitive]

(12) She hammered the metal flat. [resultative]

(13) She owned the flat metal. [transitive]

(14) *She owned the metal flat. [resultative?]

Goldberg and Casenhiser argue that the anomalous sentence in (14) would never be generated because the meaning assigned to it ("she caused the metal to become flat by owning it") makes no sense. In the usage-based approach, constructions are used to express particular communicative functions that are grounded in our perceptual experience. Returning to example (14), it should be noted that linguists have long recognized that semantics contributes to ill-formedness (i.e., this is not unique to construction grammar or to the usage-based approach). The key point, from an acquisition perspective, is that learning the function of a particular form serves to restrain analogy, thus reducing the need for recovery from overgeneralization.

Frequency

Input frequency was not discussed in the UG section of this paper because all varieties of linguistic nativism ascribe a limited role to frequency in language acquisition. This is a fundamental difference between usage-based and nativist models. Although UG-oriented researchers recognize that linguistic behavior exhibits frequency effects (Eubank & Gregg, 2002), they are unlikely to accept frequency as a causal variable in language acquisition, especially with respect to abstract linguistic knowledge. In contrast, usage-based approaches look to frequency to explain the “rules” of language, which are “structural regularities that emerge from learners’ lifetime analysis of the distributional characteristics of the language input” (Ellis, 2002a: 144). Crucially, this perspective characterizes the language learner as an “intuitive statistician” (Harrington & Dennis, 2002) that implicitly keeps track of distributional regularities.

A wide range of research studies document frequency effects at all levels of language processing and acquisition. I will not review this evidence here for reasons of space (for comprehensive reviews, see Bybee & Hopper, 2001; Ellis, 2002a). Instead, I examine the controversy surrounding frequency and examine how it interacts with other properties of the input. Indeed, frequency is controversial only if one assumes it can explain everything. Let’s consider an example from a study on negative constructions in L1 acquisition (Cameron-Faulkner, Lieven, & Theakston, 2007). In that study (discussed in Lieven & Tomasello, 2008), the child’s dominant pattern of negation until age 3;0 followed an ungrammatical [*no*+verb] pattern. Note that most [*no*+verb] utterances are ungrammatical in English and, not surprisingly, are not found in the speech sample of the child’s mother. In other words, there was no positive evidence in the input that could have led the child to produce this construction. However, the data reveal that *no* is the most frequent negator used by his mother across all utterances. Thus, the child was able to effectively negate whatever he wanted by inserting the highly frequent (and salient) *no* into a novel construction.

Even if input frequency has explanatory power for some aspects of language acquisition, can it account for abstract properties of language that are unlikely to be induced from experience? The constraints on the *want-to* contraction in English, traditionally explained in terms of traces in UG theory, have become a test case for usage-based approaches. Consider the examples below:

- (15) a. Who do you want to/wanna take to the party?
b. Who do you want to/*wanna take you to the airport?

In the UG analysis, the contraction in (15b) is barred by the presence of a trace (*t*) of *wh*-movement in the embedded subject position:

- (16) a. You want who to take you to the airport? (before *wh*-movement)
b. Who do you want *t* to take you to the airport? (after *wh*-movement)

According to White (1989), this abstract syntactic constraint on contraction is impossible to learn from the input:

None of [the necessary] information is obviously present in the input, since traces are an abstraction. The fact that *wh*-movement leaves a trace and that this trace [when Case-marked] blocks the operation of certain rules is knowledge derived from Universal Grammar, and not from the input alone, or from any general non-linguistic cognitive principles. (White, 1989: 7)

UG analyses that include phonetically-null elements and movement, as noted by Mellow (2006: 653), “circularly” create a poverty of the stimulus problem because imperceptible elements are, by definition, not present in the input. However, there are other grammatical theories that describe these seemingly “unlearnable” aspects of language in other ways (i.e., lexical dependencies and constructions). With respect to the *want-to* contraction, Ellis (2002b) has a clear and simple solution based on insights from head-driven phrase structure grammar (Sag & Fodor, 1995, 1996) and grammaticalization (Bybee, 2002). On this view, *want NP to* and *want to* are different lexicalized constructions, the second of which is much more frequent in the input. This favors a natural articulatory reduction (*wanna*), a form that has evolved to be a subject-control verb.

A recent emergentist account of the *want-to* contraction in L1 and L2 acquisition is detailed in O’Grady, Nakamura, and Ito (2008). These authors argue that frequency, in addition to efficiency-driven processing constraints, dictate where contraction is most likely to occur. The main premise behind their proposal is that “contraction is most natural where the elements involved combine without delay” (O’Grady et al., 2008: 484). In the prohibited pattern of *want-to* contraction (**who do they wanna stay?*), a delay occurs in the combination of *want* and *to* because the computational system must take the opportunity to resolve the verb’s *wh*-dependency (i.e., the second nominal argument of *want*). Although frequency figures into this proposal, O’Grady (2008a) emphasizes that frequency cannot be the sole explanation for contraction patterns. The limitation of frequency is that it cannot explain why some patterns are frequent or infrequent in the first place; for O’Grady these patterns emerge from an efficiency-driven linear parser.

Second language acquisition

The usage-based approach described in the preceding sections is heavily committed to construction-based theories of acquisition (Tomasello, 2003). However, these theories were developed from child language acquisition research and from studies of psycholinguistic processing among native speakers (cf. Bates and MacWhinney, 1989). How applicable are these insights to the task of the L2 learner? Just as UG constructs (e.g., poverty of the stimulus, parameter setting) have been adapted to the unique reality of SLA, so must usage-based models test their predictions among L2 learners if they wish to establish a unified model of language acquisition (cf. MacWhinney, 2005).

Usage-based researchers assume that, despite the important differences between L1 and L2 acquisition, the task faced by both groups of learners is largely the same.⁹ MacWhinney (2008: 341) is clear on this point: “Both groups of learners need to segment speech into words. Both groups need to learn the meanings of these words. Both groups need to figure out the patterns that govern word combination in syntactic constructions.” Since usage-based models view language acquisition as driven by general learning

mechanisms, it follows that these same mechanisms will also be present in SLA (e.g., frequency, analogy, competition between forms, tracking recurring sequences, etc.). As for the role of input, it is essentially the same in SLA as in L1 acquisition: it must be abundant enough for the learner to abstract regularities from concrete exemplars of language use. Native-like competence is the result of thousands of hours on task and the learner's lifetime implicit attention to the distributional characteristics of language input. Ellis (2002: 167) describes the evidence needed for native fluency as "vast" and others refer to a "critical mass" of input needed for acquisition to occur (cf. Gathercole & Hoff, 2007).

There are, however, important differences in how input is encountered and perceived in L2 versus L1 contexts. Whereas L1 acquisition is best described as naturalistic exposure combined with intense social support from adult caregivers (Snow, 1999), L2 input is often encountered in instructional settings, as well as in written communication. Nevertheless, the burden of responsibility is placed on the learner rather than on properties of the input itself. For example, Ellis (2004) discusses the various ways in which SLA fails to reflect the input. He describes how L2 learners fail to notice cues that are not salient, especially when these are redundant (e.g., tense marking on verbs). Additional features of the input may not be noticed if they need to be processed in a way that differs from the learner's L1. In either case, Ellis (2004: 62) concludes that such failures "reflect limits of implicit learning, working memory, or representational precursors." Similarly, Hulstijn (2002: 272) suggests that L1 entrenchment prevents L2 learners from eradicating certain errors from their production, "even when the L2 input comes in massive amounts." O'Grady et al. (2008: 497) hint that deficits in SLA are due to the "reduced sensitivity of second language learners to the distributional subtleties of the input."

Although the majority of publications in SLA from a usage-based perspective are theoretical, some empirical studies are beginning to appear (cf. Bardovi-Harlig, 2002; Mellow, 2006; Zyzik, 2006). These studies are largely motivated by Ellis's (1996, 2002a, 2003) model of SLA that is based on learners' ability to memorize sequences, detect patterns in them, and abstract regularities. Furthermore, Ellis (2002) proposed that the established L1 acquisition sequence of formula \rightarrow low-scope pattern \rightarrow construction could reasonably guide SLA research as well. Bardovi-Harlig (2002) examined longitudinal data to determine if this sequence could account for the emergence of future expressions (e.g., *will* and *going to*) among ESL learners. Her results indicate that *going to* is largely formulaic for some of the learners, appearing primarily in the phrase *I am going to write (about)*. In contrast, there was little formulaic use of *will*, since it appeared from the earliest stages with a wide variety of verbs. Mellow (2006) investigated the SLA of relative clauses in English using O'Grady's (2005) framework; his results reveal that relative clauses appear initially with a limited set of verbs (i.e., they are item-based). Zyzik (2006) examined transitivity alternations in Spanish (e.g., the contrast between transitive *romper* 'to break' and intransitive *romperse* 'to break') and proposed that L2 learners acquire the uses of the clitic *se* on a verb-by-verb basis. Her results reveal a consistent pattern of overgeneralization of *se* to transitive contexts (predicted by a sequence-learning account) and variable performance on verbs belonging to the same class. These results fit squarely into a usage-based account in which development is shaped by the learner's familiarity with particular lexical items and the sequences in which he/she has heard them.

Summary of input in the usage-based approach

It is clear from the preceding sections that fundamental differences exist between nativist and usage-based approaches in the assumed role of input. Historically, the nativist tradition has focused primarily on what input does not provide for the acquirer. For example, the input cannot provide evidence of what is impossible, nor does it cue learners in to the presence of phonetically-null elements. In contrast, usage-based theories provide detailed accounts of how input drives language acquisition. Children—and perhaps adult L2 learners—rely on the input to accumulate a repertoire of item-based patterns, which eventually yield more abstract constructions. It is absence of evidence that provides a basis for judgments of ungrammaticality. Thousands of hours of exposure give native speakers an impressive ability to gauge the frequency of particular words and the sequences in which they appear. Many of the abstract properties of language that originally motivated UG are described in lexical terms (e.g., the *want-to* contraction) or in terms of probabilities of co-occurrence (e.g., question formation with embedded relative clauses). In sum, what is most important to language development from the usage-based perspective is “the provision of good quality positive evidence” (MacWhinney, 2004: 911).

The preceding section has characterized the usage-based approach as fundamentally different from the nativist (UG) perspective. Indeed, there are many aspects that differentiate these approaches besides their take on input, and some researchers believe that the differences are irreconcilable (Tomasello & Abbot-Smith, 2002). However, there have been significant attempts to bridge the disparities between nativist and strictly usage-based theories. Most notably, O’Grady (1999, 2003, 2005) proposes a middle ground in the form of *general nativism*. In this view, humans have an innate cognitive ability for language that can be described in terms of a computational system and processing constraints. This contrasts with grammatical (UG) nativism, which posits an innate system specific to language in the form of grammatical categories and principles. Despite this critical difference, O’Grady’s proposal retains two aspects of the UG perspective: the existence of hierarchically structured symbolic representations (e.g., binary branching) and the notion that some properties of language are underdetermined by the input. O’Grady (2008b: 158) mentions the properties of binding, quantifier scope, and island constraints in arguing for poverty of the stimulus: “I do not believe that experience, even on the most generous estimate of its richness, is sufficient to support induction of complex syntax.” Thus, on the question of input, O’Grady diverges from the usage-based perspective but, at the same time, does not rely on UG to explain how these structures are acquired.

POVERTY OF THE STIMULUS IN SLA FROM A USAGE-BASED APPROACH

As described earlier, poverty of the stimulus is a construct that originated in the nativist tradition to describe situations in which children acquire structures for which there seems to be insufficient evidence in the input. This construct has been applied to SLA with some measure of success; UG researchers argue that L2 learners also demonstrate

sensitivity to properties of the target language that they could not have learned from the input (e.g., constraints on pronoun interpretation, split intransitivity).

However, a different formulation of poverty of the stimulus is certainly possible in the L2 context. It has been noted that L2 classroom environments can distort patterns of exposure, function, medium, and social interaction (Ellis & Laporte, 1997). Likewise, Bley-Vroman (1989) suggested that impoverished input is one of the factors responsible for the low levels of ultimate attainment of most L2 learners. In other words, there could very well be a poverty of the stimulus problem in SLA, but not in the traditional UG sense. From a usage-based perspective, poverty of the stimulus refers to the real problem facing many classroom L2 learners: the lack of exposure to sufficiently rich and varied input.

Currently, limited research exists on the quality and quantity of input available to L2 learners in instructed settings. The notable exceptions are several “first exposure” studies in which input conditions are precisely controlled and measured. For example, Rast (2008) examined the first eight hours of exposure to Polish in a communicative, yet carefully structured, classroom setting. By calculating the frequency of specific words and forms in the input, Rast was able to analyze learners’ performance on specific tasks as a function of the positive evidence they had received. However, first exposure studies entail several disadvantages: they are often conducted in laboratory settings with artificial languages (cf. Williams & Kuribara, 2008), and they tend to be limited to short periods of time (i.e., several hours or weeks). As noted by Robinson and Ellis (2008: 510) “we need dense longitudinal corpora of learner input” in order to study how constructions emerge over time.

Some researchers have begun to utilize corpus data, comparing it with L2 textbook presentation, in order to describe what classroom input might look like. Juffs (1998) conducted a frequency analysis of verbs in a series of ESL textbooks, suspecting that teaching materials may fail to provide adequate input in the area of syntax-semantics correspondences. His analysis revealed that causative/inchoative verbs and stimulus psych verbs were underrepresented in the materials in terms of token frequency and the syntactic environments in which they appeared. Biber and Reppen (2002) found a sharp disconnect between six ESL grammar textbooks and corpus-based frequency findings. For example, nouns functioning as adjectives (e.g., *leather seat*) are extremely frequent in usage (especially in written registers), although they are seldom discussed or illustrated in textbooks. Biber and Reppen recommend a revision of pedagogy to reflect patterns of actual usage, rather than relying on the intuitions of materials developers. Most recently, Goodall (2008) compared the input in Spanish textbooks with data from the Corpus del Español (www.corpusdelespañol.org), focusing on two distinct cases: the present progressive and so-called reflexive verbs. Goodall’s analysis showed that the progressive is massively overrepresented in textbooks, despite the fact that the forms are highly regular and thus, easily learned with little input. In contrast, textbook coverage of reflexive verbs is heavily skewed towards cases of the “true reflexive,” while omitting the most frequent reflexively marked verbs (e.g., *acordarse* ‘to remember,’ *irse* ‘to leave’). Goodall concluded that both kinds of skewed input might have negative consequences for the L2 learner.

Textbook analyses of particular constructions compared with corpus data is a good point of departure for future, more rigorous studies of input in instructed L2 settings.

Admittedly, what is included or omitted in textbooks is only an approximation of the input available to L2 learners. We need more classroom-based studies like that of Meara, Lightbown, and Halter (1997), who examined speech samples from various teachers in an intensive ESL program, focusing on the provision of high-frequency and unusual vocabulary words. Although L2 classrooms are unlikely to mirror naturalistic input in quality or quantity, Bybee (2008: 233) reminds us that “natural frequency distributions do not have to be exactly reproduced in the classroom.” This is due to the fact that high-frequency items are so overly abundant in the input that learning them should be unproblematic, even in classroom environments. On the other hand, lower-frequency constructions and prefabricated sequences will require more attention.

To conclude this section, a case has been made for considering instructed SLA as a potential poverty of the stimulus situation, but not in the traditional nativist sense of stimulus poverty. Several corpus studies reviewed here (Biber & Reppen, 2002; Goodall, 2008) suggest that the input to L2 learners may be skewed in ways that deviate from actual usage, potentially obstructing the task of input-driven language learning. Clearly, further research is necessary to confirm how closely classroom input corresponds to the models provided by such teaching materials.

CONCLUSION

This paper has provided a broad overview of the role of input in two contrasting theories of language acquisition. Admittedly, there are several other aspects that distinguish these approaches, each of which would require a separate article to be treated adequately. The focus on input, although seemingly narrow in scope, provided for a more in-depth characterization of poverty of the stimulus phenomena. Among usage-based researchers, there is widespread dismissal of the poverty of the stimulus; the input is rich enough for children to acquire all the properties of language if mechanisms such as item-based learning, competition among forms, indirect negative evidence, and sensitivity to frequency are given serious consideration. Many abstract linguistic structures are indeed learnable from the input if the theoretical commitment to movement and phonetically-null elements is abandoned. Whether or not all abstract syntax can ultimately be explained by domain-general mechanisms is still an open question. This is indeed a challenge for the usage-based approach, which is theoretically committed to expanding the scope of inquiry to include aspects of linguistic competence previously relegated to the periphery (e.g., collocations, idioms, and idiosyncratic constructions). Another equally important challenge is to test the predictions of the usage-based model with L2 learners. At present, usage-based concepts have found an open forum in the field of SLA (cf. Robinson & Ellis, 2008), but more empirical work is necessary to substantiate the theoretical claims in this new context. Meeting this challenge will necessarily entail careful scrutiny of input conditions in both instructed and naturalistic L2 settings.

NOTES

¹ Pullum and Scholz (2002) argue that these two facets of the problem should be treated separately, and in their seminal paper they address only the situation in (2), what they call “stimulus poverty”, or learning “from an environment that is typically not rich enough to provide crucial evidence...” (p. 16).

² Cook (2003) found that these results hold for non-native speakers of English; his L2 learner groups overwhelmingly rejected sentences with structure dependency violations in a grammaticality judgment task.

³ Negative evidence refers to information about what is ungrammatical. This could take the form of a recast (e.g., a parent correcting a child's non-targetlike utterance) or explicit correction (e.g., a teacher telling an L2 learner that his/her utterance is incorrect).

⁴ Hawkins (2008) is referring to examples in which the overt pronoun appears as a complement of a preposition: "*Todo el mundo dice que el presidente habla de él.*"

⁵ Spanish, however, has other relevant manifestations of unaccusativity, including postverbal subjects, the absolute construction, and bare plurals in postverbal position (see Montrul 2004, 2005 for details).

⁶ There is another passive construction in Japanese (*ni yotte*) that is compatible with both perfective and non-perfective readings because it lacks the feature "affectivity."

⁷ *Wh*-questions with embedded relative clauses should provide evidence about structure dependence because the moved auxiliary derives from the main clause and not the relative clause (see also MacWhinney, 2004 for a discussion of this point).

⁸ The model was trained on sentences from the Bernstein-Ratner (1984) corpus, which the authors describe as "a relatively small and very noisy corpus, mostly containing short sentences with simple grammatical structure" (Real & Christiansen, 2005: 1012).

⁹ For usage-based/emergentist researchers, the fact that L2 learners already have an established L1 system constitutes the primary inhibitory factor in SLA. For example, MacWhinney (2008) refers to the entrenchment of the L1 as the cause of age-related effects in SLA.

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REFERENCES

- Bardovi-Harlig, K. (2002). A new starting point? Investigating formulaic use and input in future expression. *Studies in Second Language Acquisition*, 24, 189-198.
- Bates, E., & MacWhinney, B. (1989). Functionalism and the Competition Model. In B. MacWhinney & E. Bates (Eds.), *The cross-linguistic study of language processing*. (pp. 3-73). Cambridge: Cambridge University Press.
- Bernstein-Ratner, N (1984). Patterns of vowel modification in motherese. *Journal of Child Language*, 11, 557-578.
- Biber, D., & Reppen, R. (2002). What does frequency have to do with grammar teaching? *Studies in Second Language Acquisition*, 24, 199-208.
- Bley-Vroman, R. (1989). What is the logical problem of foreign language learning? In S. Gass & J. Schachter (Eds.), *Linguistic perspectives on second language acquisition* (pp. 41-68). Cambridge: Cambridge University Press.
- Bruhn de Garavito, J., and Valenzuela, E. (2008). Eventive and stative passives in Spanish L2 acquisition: A matter of aspect. *Bilingualism: Language and Cognition*, 11, 323-336.
- Bybee, J. (1995). Regular morphology and the lexicon. *Language and Cognitive Processes*, 10, 425-455.

- Bybee, J. (2002). Phonological evidence for exemplar storage of multiword sequences. *Studies in Second Language Acquisition*, 24, 215-221.
- Bybee, J. (2008). Usage-based grammar and second language acquisition. In P. Robinson & N.C. Ellis (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition* (pp. 216-236). New York: Routledge.
- Bybee, J., & Hopper, P. (Eds.) (2001). *Frequency and the emergence of linguistic structure*. Amsterdam: John Benjamins.
- Cameron-Faulkner, T., Lieven, E., & Theakston, A. (2007). What part of *no* do children not understand? A usage-based account of multiword negation. *Journal of Child Language*, 34, 251-282.
- Carroll, S. (2001). *Input and evidence: The raw material of second language acquisition*. Amsterdam: John Benjamins.
- Chaudron, C. (1985). Comprehension, comprehensibility, and learning in the second language classroom. *Studies in Second Language Acquisition*, 7, 216-232.
- Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge: MIT Press.
- Chomsky, N. (1980). *Rules and representations*. Oxford: Basil Blackwell.
- Chomsky, N. (1981). *Lectures on government and binding: The Pisa lectures*. Berlin: Mouton de Gruyter.
- Chomsky, N. (1995). *The minimalist program*. Cambridge, MA: MIT Press.
- Cook, V.J. (1991). The poverty-of-the-stimulus argument and multicompetence. *Second Language Research*, 7, 103-117.
- Cook, V.J. (2003). The poverty-of-the-stimulus argument and structure-dependency in L2 users of English. *IRAL*, 41, 201-221.
- Crain, S., and Nakamaya, M. (1987). Structure dependence in grammar formation. *Language* 63, 522-543.
- Croft, W. (2000). *Explaining language change: An evolutionary approach*. London: Longman.
- Dekydtspotter, L., & Sprouse, R. (2001). Mental design and (second) language epistemology: Adjectival restrictions of wh-quantifiers and tense in English-French interlanguage. *Second Language Research*, 17, 1-35.
- Ellis, N.C. (1996). Sequencing in SLA: Phonological memory, chunking, and points of order. *Studies in Second Language Acquisition*, 18, 91-126.
- Ellis, N.C. (2002a). Frequency effects in language processing. *Studies in Second Language Acquisition*, 24, 143-188.
- Ellis, N. C. (2002b). Reflections on frequency effects in language acquisition: A response to commentaries. *Studies in Second Language Acquisition*, 24, 297-339.
- Ellis, N.C. (2003). Constructions, chunking, and connectionism: The emergence of second language structure. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 63-103). Oxford: Blackwell.
- Ellis, N.C. (2004). The processes of second language acquisition. In B. VanPatten, J. Williams, S. Rott, & M. Overstreet (Eds.), *Form-meaning connections in second language acquisition* (pp. 49-77). Mahwah, NJ: Erlbaum.
- Ellis, N.C., & Laporte, (1997). Contexts of acquisition: Effects of formal instruction and naturalistic exposure on second language acquisition. In A.M.B. de Groot & J.F. Kroll (Eds.), *Tutorials in bilingualism: Psycholinguistic perspectives* (pp. 53-83). Mahwah, NJ: Erlbaum.
- Elman, J.L. (2005). Connectionist models of cognitive development: Where next? *Trends in Cognitive Sciences*, 9(3), 111-117.
- Eubank, L., & Gregg, K. (2002). News flash: Hume still dead. *Studies in Second Language Acquisition*, 24, 237-247.
- Gass, S. (1997). *Input, interaction, and the second language learner*. Mahwah, NJ: Erlbaum.
- Gathercole, V.C.M., & Hoff, E. (2007). Input and the acquisition of language: Three questions. In E. Hoff & M. Shatz (Eds.), *Handbook of language development* (pp. 107-127). London: Blackwell.
- Gregg, K.R. (2003). The state of emergentism in second language acquisition. *Second Language Research*, 19, 95-128.
- Goldberg, A. (1995). *Constructions: A construction grammar approach to argument structure*. Chicago: University of Chicago Press.
- Goldberg, A., & Casenhiser, D. (2008). Construction learning and second language acquisition. In P. Robinson & N.C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 197-215). New York: Routledge.

- Goodall, G. (2008, October). Poverty/richness of the stimulus in Spanish instructed second language acquisition. Paper presented at the Hispanic Linguistics Symposium, Laval University, Québec City, Canada.
- Gordon, P. (1986). Level ordering in lexical development. *Cognition*, 21, 73-93.
- Hara, M. (2007). Input, triggering and poverty of the stimulus in the second language acquisition of Japanese passives. *Second Language Research*, 23, 419-458.
- Harrington, M., & Dennis, S. (2002) Input-driven language learning. *Studies in Second Language Acquisition*, 24, 261-268.
- Hawkins, R. (2001). The theoretical significance of Universal Grammar in second language acquisition. *Second Language Research*, 17, 345-367.
- Hawkins, R. (2008). The nativist perspective on second language acquisition. *Lingua*, 118, 465-477.
- Hornstein, N. and Lightfoot, D. (1981). *Explanation in linguistics: The logical problem of language acquisition*. London: Longman.
- Hulstijn, J. (2002). What does the impact of frequency tell us about the language acquisition device? *Studies in Second Language Acquisition*, 24, 269-273.
- Juffs, A. (1998). The acquisition of semantics-syntax correspondences and verb frequencies in ESL materials. *Language Teaching Research*, 2, 93-123.
- Kanno, K. (1997). The acquisition of null and overt pronominals in Japanese by English speakers. *Second Language Research*, 13, 265-287.
- Kimball, J. (1973). *The formal theory of grammar*. Englewood Cliffs, NJ: Prentice Hall.
- Langacker, R. (1987). *Foundations of cognitive grammar*. Vol. 1. Stanford, CA: Stanford University Press.
- Legate, J., & Yang, C. (2002). Empirical re-assessment of stimulus poverty arguments. *The Linguistic Review*, 19, 151-162.
- Lidz, J., Waxman, S., & Freedman, J. (2003). What infants know about syntax but couldn't have learned: Experimental evidence for syntactic structure at 18 months. *Cognition*, 89, B65-B73.
- Lieven, E., & Tomasello, M. (2008). Children's first language acquisition from a usage-based perspective. In P. Robinson & N.C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 168-196). New York: Routledge.
- Lightfoot, D. (1991). *How to set parameters: Arguments from language change*. Cambridge, MA: MIT Press.
- Mellow, J.D. (2006). The emergence of second language syntax: A case study of the acquisition of relative clauses. *Applied Linguistics*, 27, 645-670.
- MacWhinney, B. (Ed.) (1999). *The emergence of language*. Hillsdale, NJ: Erlbaum.
- MacWhinney, B. (2004). A multiple process solution to the logical problem of language acquisition. *Journal of Child Language*, 31, 833-914.
- MacWhinney, B. (2005). A unified model of language acquisition. In J.F. Kroll & A.M.B. de Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 49-67). New York: Oxford University Press.
- MacWhinney, B. (2008). A unified model. In P. Robinson & N.C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 341-371). New York: Routledge.
- Meara, P., Lightbown, P., & Halter, R. (1997). Classrooms as lexical environments. *Language Teaching Research*, 1, 28-47.
- Montalbetti, M. (1984). *After binding*. PhD Dissertation, MIT.
- Montrul, S. (2004). Psycholinguistic evidence for split intransitivity in Spanish second language acquisition. *Applied Psycholinguistics*, 25, 239-267.
- Montrul, S. (2005). On knowledge and development of unaccusativity in Spanish L2 acquisition. *Linguistics*, 43(6), 1153-1190.
- Montrul, S., & Slabakova, R. (2003). Competence similarities between native and near-native speakers: An investigation of the preterite-imperfect contrast in Spanish. *Studies in Second Language Acquisition*, 25, 351-398.
- O'Grady, W. (2003). The radical middle: Nativism without Universal Grammar. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 43-62). Oxford: Blackwell.
- O'Grady, W. (2005). *Syntactic carpentry*. Mahwah, NJ: Erlbaum.
- O'Grady, W. (2008a). Innateness, universal grammar, and emergentism. *Lingua*, 118, 620-631.
- O'Grady, W. (2008b). Language without grammar. In P. Robinson & N.C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 139-167). New York: Routledge.

- O'Grady, W., Nakamura, M., & Ito, Y. (2008). Want-to contraction in second language acquisition: An emergentist approach. *Lingua*, 118, 478-498.
- Pérez-Leroux, A.T., & Glass, W. (1999). Null anaphora in Spanish second language acquisition: Probabilistic versus generative approaches. *Second Language Research*, 15, 220-249.
- Piattelli-Palmarini, M. (Ed.) (1980). *Language and learning: The debate between Jean Piaget and Noam Chomsky*. Cambridge, MA: Harvard University Press.
- Pinker, S. (2007). *The stuff of thought: Language as a window into human nature*. New York: Viking Penguin.
- Piske, T., & Young-Scholten, M. (Eds). (2008). *Input matters in SLA*. Bristol, UK: Multilingual Matters.
- Pullum, G., & Scholz, B. (2002). Empirical assessment of stimulus poverty arguments. *The Linguistic Review*, 19, 151-162.
- Rast, R. (2008). *Foreign language input: Initial processing*. Clevedon, UK: Multilingual Matters.
- Regier, T., & Gahl, S. (2004). Learning the unlearnable: The role of missing evidence. *Cognition*, 93, 147-155.
- Real, F., & Christiansen, M. (2005). Uncovering the richness of the stimulus: Structure dependence and indirect statistical evidence. *Cognitive Science*, 29, 1007-1028.
- Robinson, P., & Ellis, N.C. (Eds). (2008). *Handbook of cognitive linguistics and second language acquisition*. New York: Routledge.
- Sag, I. A., & Fodor, J. D. (1995). Extraction without traces. In R. Aranovich, W. Byrne, S. Preuss, & M. Senturia (Eds.), *Proceedings of the 13th West Coast Conference on Formal Linguistics* (pp. 365–384). Stanford, CA: CSLI Publications.
- Sag, I. A., & Fodor, J. D. (1996). A traceless account of extraction phenomena. *Languages*, 30, 8–31.
- Sampson, G. (2002). Exploring the richness of the stimulus. *The Linguistic Review*, 19, 73-104.
- Sampson, G. (2005). *The "language instinct" debate. Revised edition*. New York: Continuum.
- Schwartz, B. (1999). Let's make up your mind: "Special Nativist" perspectives on language, modularity of mind, and nonnative language acquisition. *Studies in Second Language Acquisition*, 21, 635-655.
- Schwartz, B., & Sprouse, R. (2000). When syntactic theories evolve: Consequences for L2 acquisition research. In J. Archibald (Ed.), *Second language acquisition and linguistic theory* (pp. 156-186). Malden, MA: Blackwell.
- Snow, C. (1999). Social perspectives on the emergence of language. In B. MacWhinney (Ed.), *The emergence of language* (pp. 257-276). Mahwah, NJ: Erlbaum.
- Sorace, A. (2000). Gradients in auxiliary selection with intransitive verbs. *Language*, 76, 859-890.
- Tomasello, M. (2000a). The item-based nature of children's early syntactic development. *Trends in Cognitive Sciences*, 4(4), 156-163.
- Tomasello, M. (2000b). Do young children have adult syntactic competence? *Cognition*, 74, 209-253.
- Tomasello, M. (2003). *Constructing a language*. Cambridge, MA: Harvard University Press.
- Tomasello, M., and Abbot-Smith, K. (2002). A tale of two theories: Response to Fisher. *Cognition*, 83, 207-214.
- Tomasello, M., & Brooks, P. (1998). Young children's earliest transitive and intransitive constructions. *Cognitive Linguistics*, 9, 379-395.
- White, L. (1989). *Universal Grammar and second language acquisition*. Amsterdam: John Benjamins.
- White, L. (2003). On the nature of interlanguage representation: Universal Grammar in second language acquisition. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp.19-42). Oxford: Blackwell.
- Williams, J., & Kuribara, C. (2008). Comparing a nativist and emergentist approach to the initial state of SLA: An investigation of Japanese scrambling. *Lingua*, 118, 522-553.
- Zyzik, E. (2006). Transitivity alternations and sequence learning: Insights from L2 Spanish production data. *Studies in Second Language Acquisition*, 28(3), 449-485.