CHAPTER 13

THE ROLE OF THE LINGUISTIC ENVIRONMENT IN SECOND LANGUAGE ACQUISITION

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I. SOME POSSIBLE ROLES FOR THE ENVIRONMENT

The linguistic environment for second language (L2) acquisition may be thought of in many ways, but perhaps most fundamentally in terms of the positive and negative evidence speakers and writers provide learners about the target language (TL). As positive evidence, in the process of communicating they offer models of what is grammatical and acceptable (not necessarily the same) in the L2, but also instances of ungrammatical language use at a time when learners do not know which is which. Under certain conditions they adapt their speech or writing in ways that make those models comprehensible to the learner and thereby usable for acquisition. As negative evidence, they provide direct or indirect information about what is ungrammatical. This may be explicit (e.g., grammatical explanation or overt error correction) or implicit (e.g., failure to understand, incidental error correction in a response, such as a confirmation check, which reformulates the learner's previous utterance without interrupting the flow of conversation—in which case, the negative feedback simultaneously provides additional positive evidence—and perhaps also the absence of items in the input). In addition, conversational partners may be important as facilitators and shapers of learner output and as participants in a process whereby nonnative speakers (NNSs) learn at least part of a new grammar by doing conversation. (Chapters 2 by Gregg and 3 by White, this volume, also discuss positive and negative evidence in L2 acquisition.)

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Each of these possible roles of the environment is the subject of some debate in L2 acquisition, as in first language (L1) acquisition. From an innatist perspective, the adequacy of TL performance as positive evidence for L1 or L2 acquisition is questionable given its alleged degeneracy and underspecification of the full complexity of native competence. The existence of negative evidence or, if it exists, the need to posit any major role for it in acquisition is denied on the basis of adult learners' supposed continuing (complete or partial) access to innate knowledge of universals and of constraints on the ways languages may vary. This knowledge, it is claimed, obviates the need for negative evidence and interactionally triggered retreats from overgeneralizations, and rigorous proof criteria are specified to be met by those who persist in invoking negative evidence in their theories. The need for learner output in development, and hence for conversational support, is also denied by some on the basis of individuals who have supposedly learned a language without speaking, whereas others maintain that production facilitates development, and still others that it is essential.

Few aspects of human development have turned out to be explicable solely as a function of either innate or environmental variables acting separately. Most involve both, the interaction of the two, and changes in the relative importance of each and of their interaction over developmental time (Bornstein & Bruner, 1989). A reasonable working hypothesis for L2 acquisition, therefore, would be that neither the environment nor innate knowledge alone suffice. The following review focuses on L2 (and some L1) acquisition research findings. In an updated version of the so-called Interaction Hypothesis (Long, 1981a, 1983c), it is proposed that environmental contributions to acquisition are mediated by selective attention and the learner's developing L2 processing capacity, and that these resources are brought together most usefully, although not exclusively, during *negotiation for meaning*. Negative feedback obtained during negotiation work or elsewhere may be facilitative of L2 development, at least for vocabulary, morphology, and language-specific syntax, and essential for learning certain specifiable L1–L2 contrasts.

II. FOREIGNER TALK DISCOURSE AND POSITIVE EVIDENCE

Because language acquisition entails not just linguistic input but *comprehensible* linguistic input, the relationship often goes unnoticed until abnormal cases are encountered of beginners trying to learn from (to them) incomprehensible language samples originally intended for mature speakers. Such efforts invariably result in failure in both L1 and L2 acquisition (Long, 1981a). The importance for L2 acquisition of input comprehensibility has been one of the incentives for many studies of how comprehensibility is achieved. The principal research foci in that

work have been the ways native speakers (NSs) modify their speech to NNSs, or *foreigner talk,* the conditions under which they do so, and the NNS's active role in the process of negotiation for meaning. They have been by no means the only objects of such research, however.

Research on input for L2 acquisition began in the 1970s, nearly a decade after the initial studies of "motherese" in L1 acquisition but with a broader focus than the L1 work. The earliest L2 studies were sociolinguistically oriented and sought to describe what Ferguson (1971) termed one of the "conventionalized varieties of 'simplified' speech available to a speech community," (i.e., the way NSs addressed NNSs, or *foreigner talk,* FT). Other research was motivated by a search for characteristics of "simple codes" of various kinds, including foreigner talk, child language, pidgins, early L2, telegraphese, and lecture notes, and for common processes in their creation (Bickerton, 1979; Corder, 1977; Ferguson, 1977; Janda, 1985; Meisel, 1977; Schumann, 1978; Tweissi, 1990; Zwicky & Zwicky, 1980, 1981). The third and largest body of work, and the one most comparable with the L1 acquisition research, sought to identify differences between language used with native and nonnative interlocutors, both children and adults, and to determine whether the adjustments to NNSs were necessary for or facilitative of L2 comprehension or acquisition.

Although the sociolinguistic studies focused on the NS, part of whose communicative repertoire is the ability to modify language appropriately for different interlocutors, the psycholinguistic work targeted the hearer, specifically the status of modified language as *input* to the learner, and what the characteristics of that input might suggest about the power and internal structure of the putative language acquisition device. In the case of older learners, interest was further motivated by the fact that, whereas child L1 and L2 acquisition are almost always successful, adult efforts at either typically end in partial failure. Because the differential outcome is often attributed to the deterioration or categorical loss of some as yet poorly understood language-specific biology after the closure of one or more sensitive periods, any potentially facilitative qualities of input modifications would be even more important for adults than for the language-learning child.

Ferguson's classic early work (1971, 1975; Ferguson & DeBose, 1976) identified three main "simplifying" processes in the production of FT: omission, expansion, and replacement or rearrangement, as well as some "nonsimplifying" tendencies: elaboration, regularization, and attitude expression. Omission includes nonsuppliance of articles, copulas, conjunctions, subject pronouns, and inflectional morphology (*Man eat fish, get sick*). Expansion refers to the addition of such features as unanalyzed tags (*yes, no, Ok*) to questions (*Have baby, yes?*), and the insertion of subject pronoun *you* in imperatives (*You eat now!*). Replacement and rearrangement is illustrated by NS use of uninverted questions (*You see man?*), formation of negatives with *no* plus the negated item (*No have work*),

conversion of possessive adjective-plus-noun to noun-plus-object pronoun constructions (*my father* to *father me*), and replacement of subject with object pronouns (*me have*). The FT the three processes produce is reminiscent of Tarzan comic strips (Hinnenkamp, 1982) and strikingly different from the (usually) well-formed speech to language-learning children documented by L1 acquisition studies.

Ferguson's results were potentially suspect because they had been obtained using an artificial elicitation procedure in which Stanford University students rewrote sentences as they imagined they would say them to a group of illiterate, non-European aliens who spoke no English. They were confirmed, however, by observational studies of FT across a variety of languages and settings—in Australian factories (Clyne, 1968, 1977, 1978), on German streets (Heidelberger Forschungsprojekt, 1978; Meisel, 1977), through Dutch municipal government office windows (Snow, van Eeden, & Muysken, 1981), in a U.S. department store (Ramamurti, 1977)—and in the speech not only of adults, but also of young children addressing nonnative age peers (Andersen, 1975; Katz, 1977; Wong-Fillmore, 1976). The ungrammaticality was not an artifact of written elicitation studies, in other words. Some language teachers were also occasionally observed to use ungrammatical speech (De Bot & Janssen-Van Dieten, 1984, cited in Issidorides & Hulstijn, 1992; Hakansson, 1986; Hatch, Shapira, & Wagner-Gough, 1978; Ishiguro, 1986; Kleifgen, 1985; Van Helvert, 1985, cited in Issidorides & Hulstijn, 1992). Issidorides and Hulstijn (1992, p. 148) also report that a Dutch L2 textbook (De Praatkist, 1982) for immigrant elementary school children presents dialogs in three versions, the first of which uses simplified, often ungrammatical, sentences.

Validated though they were by the naturalistic observations, the reports of deviant speech were soon far outnumbered by the findings of some 60 descriptive and quasi-experimental laboratory and classroom studies of NS–NNS conversation, the majority in university settings (for review, see Larsen-Freeman & Long, 1991). The laboratory studies showed that, like caretaker talk, most speech to NNSs (and all of it in many corpora) was a modified but well-formed version of the TL. The classroom studies revealed the same patterns, although instructional FT also includes some features of L1 teacher talk, such as framing moves and the frequent use of known information or display questions (for review, see Chaudron, 1988). Arthur, Weiner, Culver, Young, and Thomas (1980) proposed a distinction between FT, a separate, reduced code marked by nonstandard rules, and Foreigner Register, the variety of speech to NNSs that remained grammatical vis-à-vis the standard variety, but differed, like any register, in terms of the frequency of certain linguistic elements.

Most speech adjustments to NNSs are quantitative, not categorical, and result in *grammatical* input. Although there is considerable individual variation and more than a little inconsistency across studies, FT in and out of classrooms tends to be well formed (Freed, 1978; Henzl, 1979), delivered more slowly than speech

to NSs (Derwing, 1990; Hakansson, 1986; Ishiguro, 1986), with clearer articulation and fewer sandhi processes, such as contraction, in both the oral mode (Henrichsen, 1984) and in NS to NSS signing (Swisher, 1984). Again, with considerable variability, grammatical FT often employs shorter, syntactically or propositionally less complex utterances (Arthur et al., 1980; Early, 1985; Freed, 1978; Gaies, 1977; Ishiguro, 1986; Scarcella & Higa, 1981; Shortreed, 1993), and a narrower range of higher frequency vocabulary items (Arthur et al., 1980; Tweissi, 1990).

FT is not always linguistically simpler, however (Long, 1980) and can occasionally even be more complex (Pica, Young, & Doughty, 1987; Ross, Long, & Yano, 1991; Tweissi, 1990). In such cases, comprehensibility is maintained by accompanying interactional adjustments and by the tendency for FT to be a more "regular" and more redundant version of the TL than that intended for NSs (Long, Ghambiar, Ghambiar, & Nishimura, 1982; Tweissi, 1990; Wesche & Ready, 1985). Examples of regularity and redundancy include the more frequent use of canonical word orders, retention of more optionally deleted constituents (such as subject pronouns in prodrop languages, and of full noun phrases (NPs) instead of anaphoric referents), and more complete overt marking of grammatical and semantic relations (such as Japanese particles indicating topic, subject, object, directionals and locatives). Such features are often absent in NS–NS conversation if made redundant by context. These and other changes are widely observed in adult speech to NNSs, and also in the speech of young children addressing NNS age peers (Andersen, 1975; Cathcart-Strong, 1986; Hirvonen, 1988; Katz, 1977; Peck, 1978; Wong-Fillmore, 1976).

What NSs react to when adjusting their speech to NNSs has been the subject of some research. Individual NSs incorporate specific features of their interlocutors' nonnative varieties (Clyne, 1978; Hatch et al., 1978), but a simple matching hypothesis is untenable. As Meisel (1977) points out, although both NNSs' developing grammars (always) and NSs' FT (less often) exhibit simplification processes resulting in omission and other kinds of ungrammaticality, interlanguages (ILs) are marked by certain other kinds of processes and "errors," such as overgeneralization (children*s*, the boy go*ed*) not found in FT. Laboratory studies suggest that NSs react to a combination of factors when they make linguistic or conversational adjustments. They initially adapt to the comprehensibility of the NNS's speech (e.g., its degree of accentedness) (Varonis & Gass, 1982), although age, physical appearance, and L2 proficiency, occasionally also play a role. As a conversation or lesson progresses, however, modifications become less a function of NNS comprehensibility, and other factors come into play. Adjustments become more extensive and more varied for NNSs of lower proficiency (Gaies, 1977; Lynch, 1987; Snow et al., 1981), and increasingly reflect the NS's perception of the NNS's comprehension (Long, 1983a; Warren-Leubecker & Bohannon, 1982).

The trigger for *ungrammatical* FT, a categorical change on the NS's part, is less

clear. Valdman (1981) suggested that ungrammaticality maintains distance between NSs and subordinate NNSs while allowing the NNSs to participate in the dominant group's world. After reviewing 40 studies, Long (1981c) suggested four relevant factors: (1) zero or very low NNS proficiency in the language of communication, (2) (perceived or genuine) higher NS social status, (3) prior FT experience, but only with NNSs of low L2 proficiency, and (4) the spontaneity of the conversation. Considerable variation was evident at the level of the individual speaker, however, and at least one study provided counterevidence to each condition (a picture made cloudier since 1981). The best generalization still seems to be that factors (1), (2), and (4) are usually necessary for ungrammatical FT to occur, but that no single condition is sufficient.

In addition to studying linguistic input to NNSs, researchers broadened their focus in the late-1970s to include the structure of NS–NNS conversation in which it occurred, or FT discourse (FTD) (Hatch et al., 1978; Long, 1980, 1981a). When interlocutor, task, and setting variables were controlled, few statistically significant differences other than shorter utterance length distinguished the linguistic characteristics of speech to NSs and NNSs. The *interactional* structure of conversations with NS and NNS interlocutors differed significantly, however. This was especially true on so-called two-way tasks, the completion of which required participants to exchange information held uniquely by them at the outset. Conversely, one-way tasks, such as storytelling and giving instructions, where only the NS held unknown information, tended not to produce statistically significant modifications of either input or interactional features, even when the NS was aware of the NNS's limited linguistic ability. It appears that the informational structure of two-way tasks obliges NSs and NNSs to negotiate for meaning, and through the negotiation process, to make what they say comprehensible to their interlocutors. *Negotiation for meaning* is the process in which, in an effort to communicate, learners and competent speakers provide and interpret signals of their own and their interlocutor's perceived comprehension, thus provoking adjustments to linguistic form, conversational structure, message content, or all three, until an acceptable level of understanding is achieved.

The devices employed in the negotiation process—repetitions, confirmations, reformulations, comprehension checks, confirmation checks, clarification requests, etc.—are used both strategically, to avoid conversational trouble, and tactically, to repair communication breakdowns when they occur (Long, 1983c; Varonis and Gass, 1985a, 1985b). All have been found to occur more frequently in NS–NNS than in NS–NS conversation (Early, 1985; R. Ellis, 1985; Long, 1980, 1981b, 1983c; Mannon, 1986; Pica & Doughty, 1985; Tweissi, 1990; Wesche & Ready, 1985), on two-way rather than one-way tasks (Doughty & Pica, 1986; Long, 1980; Pica, 1987), on unfamiliar tasks or with unfamiliar interlocutors (Gass & Varonis, 1985), in mixed rather than same L1 dyads (Varonis & Gass, 1985a), with mixed rather than same proficiency interlocutors (Porter, 1983), and

in mixed rather than same gender dyads (Gass & Varonis, 1986; Pica, Holliday, Lewis, & Morgenthaler, 1989; for review, see Long, 1989, 1990; Long & Porter, 1985; Pica, 1992).

Interactional adjustments can affect input in various ways. Thus, partial repetition can reduce mean utterance length, a here-and-now orientation can increase the proportion of verbal elements marked temporally for present, and semantic repetition, or paraphrase, can include lexical switches, as illustrated (using constructed examples for comparative purposes) in (1b):

(1) a. (NS–NS conversation)
Do you like the city?

I love it.

b. (NS–NNS conversation)
Do you like the city?

Huh?

Do you like Los Angeles?

Yes, very nice.

They can also operate quite independently, however, as shown in (1c), where exact self-repetition succeeds in getting the message across to the NNS without the linguistic input itself having changed at all.

c. Do you like the city?

Huh?

Do you like the city?

Yes, very nice.

Similarly, (1b) and (1c) also differ from (1a) in their interactional structure, due to the NS's use of semantic and exact self-repetition, respectively, but from an input perspective, exhibit identical utterance structure.

Various other interactional modifications are commonly observed. Conversational topics tend to be treated simply and briefly in FTD, as measured by "information bits" (Arthur et al., 1980) or the ratio of topic-initiating to topic-continuing moves (Gaies, 1981; Long, 1981b). Possibly for cultural reasons, the kinds of topics nominated (e.g., personal or impersonal) can also differ from those preferred in NS–NS conversation, with topic sequences less predictable in FTD, and topic shifts more abrupt (Scarcella, 1983). As in caretaker–child conversation, and despite the absence of cognitive limitations in the adult, a slight here-and-now orientation is often observable in FTD in and out of classrooms, as measured by the relative frequencies of verbs marked temporally for present and nonpresent (Gaies, 1981; Long, 1980; Long & Sato, 1983). Unless the task dictates otherwise, NSs attempts to relinquish topic control in various ways. "Or choice" questions (Hatch, 1978), as in (2), make NNSs' participation easier by containing potential answers in the form of a list of responses from which they can choose:

(2) Well what are you doing in the United States? . . . Are you just studying? Or do you have a job? Or—

No, I have job.

Acceptance of unintentional NNS topic-switches also facilitates NNS participation. If the task allows, skillful NNs may treat an inappropriate response as a topic nomination, as in (3), simultaneously repairing the discourse and allowing the NNS to determine topic:

(3) Are you going to visit San Francisco? Or Las Vegas?

Yes, I went to Disneyland and to Knott's Berry Farm.

Oh Yeah?

High frequencies of NS questions of various kinds are one of the most salient characteristics of FTD, probably reflecting NSs' attempts to encourage NNSs to talk. Uninverted (intonation) and yes–no questions are favored with lower proficiency NNSs, presumably because, unlike wh-questions, they maintain canonical word order and contain all the propositional information needed for a minimally adequate response, which may take the form of a simple confirmation or denial. They are especially frequent in topic-initiating moves, and are also widely used as confirmation checks, comprehension checks, and clarification requests. NSs sometimes help out by providing anticipated answers to their own questions, as in (4):

(4) Right. *When* do you take the break? At 10:30?

Additional adjustments are apparently designed to increase topic saliency. These include use of a slower rate of delivery, left-dislocation, stress on key information-bearing words, and pauses before or after them, as in (5):

(5) Did you . . . *like* San Diego? . . . San Diego . . . did you like it?

Also serving to make topics salient is "decomposition" (Long, 1980), as shown in (6):

(6) a. When do you go to the, uh, Santa Monica? . . . You say you go fishing in Santa Monica, right?

Yeah.

When?

b. Uh, what does your father do in, uh, you're from Kyoto, right?

Yeah.

Yeah. What does your father do in
Kyoto?

Decomposition occurs when a topic nomination in the form of a wh-question is repaired, either after it fails to elicit a response (6a) or to preempt failure (6b), by breaking it down into two parts. First, repetition of the (sub)topic in isolation is used to establish what is being talked about, the repetition usually taking the form of a yes–no or uninverted (intonation) question, often with a tag (*right?*) added. After the NNS confirms that the topic has been understood, the comment, in the form of a question about the topic, is restated. Decomposition occurs more frequently in NS–NNS conversation (Tweissi, 1990), and like most interactional adjustments, can be used, as in (6a) and (6b), preemptively and reactively.

Although the underlying simplification and elaboration processes in adjustments to NNSs may be universal, coding devices for interactional modifications, such as retention of redundant morphological marking and changes among question forms, can vary cross-linguistically (see Tweissi, 1990), and the use of at least some interactional modifications may be culture-specific. Shortreed (1993), for example, reports less NS self-repetition in NS–NNS dyads than in NS–NS controls in a laboratory study of Japanese FTD, a finding he attributes to the previously documented higher frequency of back-channeling and redundancy in spoken Japanese than English conversation. Indeed, it is possible that input or interactional modifications differ across classes, genders, and cultures, just as speech adjustments for children reportedly do. This is a crucial issue for future research and implies systematic extension of the database to include populations rarely, if ever, sampled in work to date, such as informants with no previous contact with NNSs or from cultures with different norms concerning appropriate ways of communicating with children or outsiders. The absence of adjustments in any successful L2 acquisition context would eliminate input or interactional modifications or both as necessary for acquisition, although leaving their facilitative status an open question.

III. THE INSUFFICIENCY OF COMPREHENSIBLE INPUT

The importance of input interpretability for L2 acquisition has motivated a number of studies of the effect of input and interactional adjustments on the comprehensibility of spoken and written discourse. When exclusively linguistic adjustments for NNSs are made to lectures or reading passages intended for NSs, the typical result is *simplification,* with shorter, syntactically less complex utterances or sentences, use of a narrower range of verb tenses, fewer modifiers, and frequently some loss of semantic content. Extreme simplification can result in ungrammaticality. Interactional modifications, on the other hand, produce longer texts, in which mean utterance or sentence length and syntactic complexity are

maintained or even increased. Interactional adjustments compensate for linguistic complexity by *elaboration* (i.e., adding redundancy to discourse through the use of repetition, paraphrases and appositionals) and by making semantic structure more explicit, as shown in (7):

(7) a. NS baseline version
Because he had to work at night to support his family, Paco often fell asleep in class.
b. Simplified version
Paco had to make money for his family. Paco worked at night. He often went to sleep in class.
c. Elaborated version
Paco had to work at night to earn money to support his family, so he often fell asleep in class next day during his teacher's lesson.

It has been shown that linguistic adjustments that result in ungrammaticality do not necessarily enhance comprehension. Issidorides (1988) compared the comprehensibility to zero beginners and low-proficiency listeners of three versions of a set of sentences: (1) nonsimplified (e.g., The apple is on the table), pronounced with normal intonation, (2) nonsimplified, pronounced with a flat, monotonous intonation (i.e., with equal pitch on all syllables), and (3) simplified (e.g., Apple on table), with semantically redundant function words omitted, but uttered with normal intonation. The nonsimplified sentences uttered with normal intonation proved to be no more difficult for subjects to understand than the ungrammatical simplified ones, whereas the prosodically monotonous versions seriously affected comprehension by the beginners. Similarly, Issidorides and Hulstijn (1992) found that normal grammatical Dutch sentence patterns involving some obligatory inversion rules were no more difficult for learners of Dutch than "simplified" ungrammatical versions that preserved canonical word order and omitted verb inflection, provided they did not convey extremely implausible meanings.

Modifications that preserve grammaticality generally do facilitate message comprehension. Yano et al. (1994) reviewed 15 investigations of the absolute or comparative effectiveness of simplification and elaboration on SL comprehension. Generalizations were difficult because of differences across studies with respect to modality, approach to modification, specific examples of each type of modification employed, and how and when comprehension was assessed. Six generalizations were possible, nevertheless, and have been strengthened by subsequent findings.

1. Comprehension is usually increased by linguistic simplification, although simple sentences alone do not always help and can even hinder.

2. Simplification and elaboration often co-occur, but when their effects can be distinguished, simplification is not consistently superior to elaboration, and some studies find elaboration more effective.

3. Comprehension is consistently improved by (a) interactional modifications, and (b) by a combination of simplification and elaboration.
4. Modifications are more useful to NNSs of lower L2 proficiency.
5. Apart from rate of delivery, isolated input or interactional adjustments, such as shorter sentence length or greater topic saliency, are insufficient to improve the comprehensibility of whole texts.
6. NNSs' perceived comprehension is greater when speech has been modified for them.

In sum, input must be comprehensible for acquisition to occur, and there is some evidence that global linguistic and conversational adjustments to NNSs improve comprehensibility.

Although *necessary* for L1 or L2 acquisition, however, there is abundant evidence that comprehensible input alone is *insufficient,* particularly with adults and if nativelike proficiency is the goal. An important source of data on this issue are the evaluations of L2 achievement by pupils in Canadian French immersion programs, reviewed by Swain (1981, 1991, and elsewhere). Studies have shown that students attain levels in French far superior to those typically achieved in foreign language programs, indeed levels good enough for immersion students' abilities routinely to be compared with those of monolingual French-speaking age peers (e.g., Barik & Swain, 1976), something inconceivable with most foreign language learners. When this is done, immersion students are found to perform comparably with NSs on tests of listening and reading comprehension, but not on production measures, such as a cloze test (Hart & Lapkin, 1989). Even after daily school instruction through the medium of the L2 for nearly 7 years in one program (Swain, 1985), 9 years in another (Lapkin, Swain, & Cummins, 1983, cited in Swain, 1985, p. 245), or continued L2 exposure at university (Vignola & Wesche, 1991, cited in Wesche, 1994), immersion students continue to make a wide range of grammatical errors in such domains as verb tenses, prepositional usage, and gender-marking on articles, and to lack some basic vocabulary items (Harley & Swain, 1978, 1984; Lapkin, Hart, & Swain, 1991). In general, productive skills "remain far from native-like" (Swain, 1991, p. 98). A similar plateauing effect in some verb tense and gender marking morphology across grades 1–4 by children in the Culver City Spanish immersion program was reported by Plann (1976, 1977).

Premature stabilization with non-TL rules is also observed in adults who should have acquired nativelike abilities if prolonged exposure to comprehensible input was necessary *and* sufficient for development. Cases abound of learners who have lived in an L2 environment for many years, some of whom communicate successfully through the L2, many of whom face constant communication difficulties (suggesting that communicative need alone is not enough to drive IL development, either), and all of whom retain numerous deviant forms in their speech. Schmidt (1983), for example, provided a detailed longitudinal case study of Wes, an adult

Japanese naturalistic acquirer of English in Honolulu. Wes could communicate well enough to satisfy his basic needs in English (e.g, to order food in restaurants), often quite appropriately from a sociolinguistic standpoint, through the skillful use of formulaic utterances. He had little morphology, however, and showed little progress in learning any over a 5-year period during which he lived in an almost entirely English-speaking world both at home and at work, and despite having a close to optimal sociopsychological and affective profile.

Further evidence of the insufficiency of comprehensible input is found in the observation that, even when errors are not involved, many quite advanced learners also never incorporate into their ILs lexical items, grammatical constructions, and distinctions that are successfully learned, often quite early, by child NSs. To illustrate, graduating high school French immersion students were found to lack basic vocabulary knowledge and to perceive this (Harley & King, 1989; Harley & Swain, 1984; Hart & Lapkin, 1989). Similarly, after lengthy L2 exposure, 38 Italian adults learning English naturalistically while living and working in Scotland developed less sophisticated relativization abilities than 48 instructed high school English as a Foreign Language (EFL) students in Italy with far less exposure (Pavesi, 1986). Fewer of the adults could form relative clauses to 80% criterion out of the lowest five categories in the noun phrase accessibility hierarchy (E. Kennan & Comrie, 1977), despite functioning in English at home and at work for an average of 6 years (range 3 months to 25 years), although it should be remembered that relative clauses are widely reported to be infrequent in most face-to-face conversation. (For additional discussion of the noun phrase accessibility hierarchy in L2 acquisition, see chapters 4 by Flynn and 6 by Eckman, this volume. In addition, chapter 6 includes a fulsome treatment of the hierarchy with examples. Chapters 14 by Berent and 18 by Seliger treat the role of the hierarchy in the acquisition of English by deaf learners and in L1 attrition, respectively.) Few of the naturalistic acquirers (mostly restaurant waiters) were able to relativize out of NP positions (genitive and object of a comparative) at the more marked end of the implicational hierarchy at all.

In addition to the empirical evidence, there are learnability arguments against the sufficiency of comprehensible input. White (1987, 1989) and others have argued for a need for negative evidence if SL acquirers are to attain nativelike proficiency in cases where learner hypotheses or the structure of the L1 leads to L2 overgeneralizations from which it is impossible to recover on the basis of positive evidence alone. French, for example, allows placement of adverbs between verb and direct object, as in *Je bois* toujours *du café* (* 'I drink *every day* coffee'), whereas English does not. The English speaker learning French should have no problem with the contrast because it involves adding an option that will be learnable from examples in the input (positive evidence). The problem is for French speakers learning English. The structure of French will lead them to produce verb-adverb-direct object strings, and there will be nothing in the input (no ungram-

matical utterances with asterisks) to tell them they are wrong. A subset of cases like these, including the present example, are especially problematic, and the prognosis for recovery particularly poor, White argued, because the ungrammatical utterances are perfectly comprehensible, and so will not cause a communication breakdown that might alert the NNS that something was amiss. It could be argued, contra White, that some learners might notice the absence of such utterances in the English input (indirect negative evidence). However, as attested by the persistence of adverb placement errors in the speech of many very advanced ESL speakers, such contrasts do provide fertile ground for premature IL stabilization. (On negative evidence in L2 acquisition, see also Bley-Vroman, 1986; Rutherford, 1987; Rutherford & Sharwood-Smith, 1988; Schachter, 1983, 1986, 1991; and for a seminal review, Birdsong, 1989.) (The Subset Principle (SP) and its putative role in L2 acquisition are also discussed in chapters 2 by Gregg, 3 by White, and 10 by Gass, this volume. Chapter 14 by Berent includes discussion of the SP in the acquisition of English by deaf learners and chapter 18 by Seliger suggests a role for this principle in accounting for L1 attrition. Finally, chapter 16 by Andersen and Shirai applies the notion to the acquisition of verb aspect.)

Environmental support in the form of comprehensible input is necessary for language learning, but insufficient for learning certain specifiable aspects of an L2. Paradoxically, comprehensible input may actually inhibit learning on occasion, because it is often possible to understand a message without understanding all the structures and lexical items in the language encoding it, and without being aware of not understanding them all. Linguistic redundancy, contextual information, and knowledge of the world can all compensate for the unknown elements. Learners may not notice new forms precisely because, at a global level, a message is comprehensible, with the result that their focal attention is directed elsewhere. Because overt NS correction of NNS errors is as rare in noninstructional NS–NNS conversation (Chun, Day, Chenoweth, & Luppescu, 1982) as it is in caretaker–child communication (Brown & Hanlon, 1970; Hirsh-Pasek, Treiman, & Schneiderman, 1984), a failure to comprehend may sometimes be needed if IL development is to proceed (White, 1987). Communicative trouble can lead learners to recognize that a linguistic problem exists, switch their attentional focus from message to form, identify the problem, and notice the needed item in the input. In other words, although some learners may stabilize prematurely because they receive little comprehensible input despite lengthy L2 exposure, as Terrell (1990) claims, the far from nativelike proficiency of so many learners, such as Wes and the Canadian French immersion students, who clearly encounter plenty of usable data, suggests that success or failure to learn can rarely if ever be attributed to the environment alone. Part of the explanation lies inside the learner, most importantly in the areas of attention, awareness, and cognitive processing.

IV. INPUT AND COGNITIVE PROCESSING

A. Attention, Awareness, and Focus on Form

Attention is widely claimed to be both necessary and sufficient for extracting items from a stimulus array (e.g., linguistic input) and storing them in long-term memory (one step in several needed to convert input to intake), with each instance an item is encountered and attended to leading to storage in memory, although not necessarily to efficient retrieval, in some theories, (e.g., Logan's Instance Theory) (Logan, 1988; Robinson & Ha, 1993). It has been claimed that learners' focus of attention and noticing of mismatches between the input and their output determines whether or not they progress (Schmidt & Frota, 1986), and that *noticing*, or conscious perception (for which attention is a prerequisite), is necessary and sufficient for converting input into intake, at least for low-level grammatical items, such as plural or third-person singular *s* (Schmidt, 1990a, 1993, 1994).

Schmidt's claim about the necessity of noticing does not refer to higher level understanding or awareness of language:

> I use *noticing* to mean registering the simple occurrence of some event, whereas *understanding* implies recognition of a general principle, rule, or pattern. For example, a second language learner might simply notice that a native speaker used a particular form of address on a particular occasion, or at a deeper level the learner might understand the significance of such a form, realizing that the form used was appropriate because of status differences between speaker and hearer. Noticing is crucially related to the question of what linguistic material is stored in memory. . . . understanding relates to questions concerning how that material is organized into a linguistic system. (Schmidt, 1990a, p. 218)

In preference to a single global construct, Tomlin and Villa argue for the greater explanatory power of three theoretically and empirically distinguishable components of attention: alertness, orientation, and detection. In their view:

> Schmidt's idea of noticing can be recast as detection within selective attention. Acquisition requires detection, but such detection does not require awareness. Awareness plays a potential support role for detection, helping set up the circumstances for detection but it does not directly lead to detection itself. (Tomlin and Villa, 1993, p. 14)

Any claim for the necessity of noticing for L2 acquisition in the higher level sense of understanding, or conscious awareness, would be problematic. Some linguistic knowledge, such as several rules for English articles, and subtle aspects of the use of the T/V distinction to mark power and solidarity in Romance and other languages, is too abstract, complex, or semantically opaque to be understood by linguistically naive learners. Some, such as gender-marking in French (Sokolik & Smith, 1992) and English dative alternation (Wolfe-Quintero, 1992) involve too

many irregularities and fuzzy categories, and some, such as subject-auxiliary inversion after preposed negative adverbials (*Seldom have I seen . . .*) and uses of *whom,* are too rare or perceptually nonsalient. Noticing in this second sense might be sufficient, but it could not be necessary for all aspects of an L2. The fact that untutored, linguistically naive learners often *are* successful with such patterns suggests, therefore, that they usually learn them on the basis of lower level conscious perception (what Gass, 1988, calls *apperceived input*) or implicitly (i.e., without conscious analysis or understanding) and that the product is tacit knowledge, (i.e., neither understanding nor awareness).

Based on reviews of the relevant L1 literature and some L2 work, Schmidt (1990a, 1990b) argues that forms that are not noticed in the first, lower level sense (i.e., not consciously perceived), do not contribute to learning. That is, there is no such thing as *subliminal* language learning. He accepts that *implicit* language learning probably occurs (i.e., learning by noticing forms without understanding the rule or principle involved) but thinks that understanding those rules is highly facilitative in cases where straightforward ones can be formulated. (For further discussion and similar views on the importance of attention, noticing, and "mental effort" in L2 acquisition see Gass, 1988; Hulstijn, 1989; Schmidt, 1993, 1994; and Watanabe, 1992.)

On this account, failure to learn is due either to insufficient exposure or to failure to notice the items in question, even if exposure occurred and the learner was attending. (A learner could attend carefully to a lecture in an L2 and still fail to notice a particular linguistic item in it.) This is the opposite position to that taken by Krashen (e.g., 1985, 1989), VanPatten (1988), and others, who have denied there is any evidence of beneficial effects of a focus on form, at least in the early stages of language learning. Krashen has claimed that adults can best learn an L2 like children learn an L1, subconsciously (i.e., incidentally, without intention, while doing something else) and implicitly (via subconscious abstraction of patterns from input data), while attending to something else (meaning). Attention to (and understanding or awareness of) linguistic forms is supposedly neither necessary nor beneficial.

While adults may learn much of a new language incidentally, a pure "L1 = L2" position is difficult to sustain for complete L2 acquisition. First, as noted earlier, there is empirical evidence of premature stabilization by learners with access to plenty of comprehensible input over long periods of time (e.g., Pavesi, 1986; Schmidt, 1983; Swain, 1991). Second, some L2 rules cannot be learned incidentally by exposure to positive evidence, because there simply is no positive evidence for them—just an absence of evidence for a transferred L1 rule. Examples include the previously mentioned constraints on the placement of English adverbs for French speakers (White, 1991), and the relinquishing of typologically more marked options for relative clause formation in the L1 when the L2 allows relative clauses only in a more restricted set of positions (Schachter, 1990). Such

rules and constraints can only be acquired if their operation is noticed, either unaided, which is unlikely, or because the absence or impermissability of an L1 construction in the L2 is brought to learners' attention by negative evidence. This can take several forms, including grammar rules, overt feedback on error, recasts, or communication breakdowns followed by repair sequences containing positive evidence of permissable alternatives.

Some support for Schmidt's position lies in Bardovi-Harlig's (1987) finding that the typologically marked preposition-stranding construction in English is acquired earlier than unmarked pied-piping, even by learners whose L1 only allows pied-piping. Bardovi-Harlig suggests that the frequency of preposition-stranding in English makes it salient and draws learners' attention to it. Also consistent are the results of experimental studies comparing learning of new L2 vocabulary and morpho-syntax by learners whose attention is partly manipulated by the researcher onto or away from the target items. In general (but not always), superior learning is seen in subjects whose attention researchers attempt to focus on the items during performance of a task using such devices as prior instructions to attend to both form and meaning (Hulstijn, 1989), showing them rules applied to examples in order to structure the input (N. Ellis, 1993), multiple-choice margin glosses (Hulstijn, 1992; Watanabe, 1992), highlighting and capitalization (Doughty, 1991), and other forms of what is referred to as "input enhancement" (Sharwood-Smith, 1991, 1993). Finally, especially relevant is a study by Alanen (1992) which, although failing to find an advantage for input enhancement, nevertheless produced strongly supportive evidence for the claimed importance of noticing. Alanen compared the learning through reading of locative suffixes and a phonological phenomenon, consonant gradation, in Finnish by 36 English speakers under one of four conditions: input enhancement (italicization), rule, rule and enhance, and control. Subjects described their thoughts as they went along in a taped think-aloud procedure. Across all four groups, the think-aloud protocols showed that subjects' performance on subsequent unexpected tests of the target items was greatly influenced by attentional focus and reported noticing during the two learning tasks, with learners who reported that they paid attention to the target forms generally having acquired them, regardless of the treatment they had received, and no learners having acquired the targets without having noticed them.

Further evidence of the suggested interaction of input and focused attention is to be found in the results of the mostly quasi-experimental classroom studies comparing groups of learners left to acquire structures incidentally with groups for whom the target structures are made more salient (enhanced) in some way (e.g., by error correction, highlighting, rule statements, seeding the input with high frequencies of the item—input-flooding—or the use of tasks with structures that encourage orientation to language in context) (Day & Shapson, 1991; Doughty, 1991; Harley, 1989; Lightbown & Spada, 1990; Manheimer, 1993; Rankin, 1990; Spada, 1987; Spada & Lightbown, 1993; Tomasello & Herron, 1989, White,

1991; White, Spada, Lightbown, & Ranta, 1991; and for review, Long, to appear). The latter groups generally learn faster (but not always—for discussion, see Mellow, 1992) and probably reach higher levels of ultimate L2 attainment provided the structures targeted are processable, and so learnable, at the time form-focused instruction occurs. Although other factors (motivation, literacy, social class, etc.) may sometimes work in favor of instructed learners, the differences may at least partly be because the attention-focusing devices increase the saliency of otherwise problematic items and cause learners to *focus on form* (Long, 1988, 1991) (i.e., to attend to language as object during a generally meaning-oriented activity). Focus on form differs from *focus on forms,* which abounds in L2 classrooms and involves a predominant, often exclusive, orientation to a series of isolated linguistic forms presented one after the other, as in a structural syllabus, with meaning and communication relegated to the sidelines. *Focus on form* involves learners' orientation being drawn to language as object, but in context. In other words, it is a claim that learners need to attend to a task if acquisition is to occur, but that their orientation can best be to both form and meaning, not to either form or meaning alone.

The continuing studies of the effect of instruction and of improvements on pure incidental L2 learning suggest a further role of the environment: that the process whereby NS and NNS negotiate to establish and maintain communication serves to promote noticing. A NS's clarification request, for example, may simultaneously provide a nativelike model of all or part of the message a NNS has just attempted to encode, perhaps making a specific linguistic item salient to the NNS in the process, as with the auxiliary in this example from NS–NNS conversation on a two-way Spot the Difference task (from Long, in press):

(8)

NNS: Uh, yes, . . . a woman drinking (and bottle) wine, uh, bottle and man drinking (a) beer

NS: Yes and she's drinking a glass or a bottle of wine?

NNS: No, uh, she? She's drinking in (no) glass.

Negative feedback of this type (i.e., in the form of implicit correction immediately following an ungrammatical learner utterance) is potentially of special utility because it occurs at a moment in conversation when the NNS is likely to be attending to see if a message got across, and to assess its effect on the interlocutor. Furthermore, given that the NNS already knows the intended meaning, the feedback occurs when attentional space is available for the NNS to orient to the form of the

response, prosodic and nonverbal cues functioning to signal that it is indeed a repair of some kind rather than an utterance with entirely new semantic content.

If a complete L2 cannot be acquired purely by incidental learning, the opposite claim, that noticing is necessary for all language learning, is also not without problems. It is unlikely that negative feedback very often materializes with nonsalient critical items highlighted at a developmental time when the feedback is usable, or that when it does, noticing always occurs. (Example 8 provides no direct evidence of noticing, of course.) The claim here, then, is that negative feedback is generally facilitative of L2 acquisition, and necessary for the acquisition of specifiable L2 structures (such as the English adverb-placement example for French speakers) for which positive evidence will be insufficient. A mechanism is posited whereby, while correct form–meaning associations are strengthened both by positive evidence *and* that negative feedback that contains positive evidence, incorrect associations are weakened and in some cases ultimately relinquished altogether as a result both of negative evidence *and* prolonged absence of support in the input. This last might be a process not unlike subtractive bilingualism, in which, as a new language is acquired, an earlier acquired one is gradually forgotten and even lost altogether if it is neither encountered nor used for long periods.

B. Negative Evidence

Simply claiming that negative feedback or some other kind of negative evidence takes care of noticing nonsalient or nonoccurring forms in the input can constitute just as miraculous a solution to the problems of underdetermination and overgeneralization as positing innate linguistic knowledge. Those who rely on negative evidence are justifiably called upon to do more than assert their remedy. For Pinker (1989) in L1 acquisition, and Beck and Eubank (1991) in L2, among others, it must be shown that negative evidence (1) exists, (2) exists in usable form, (3) is used, and (4) is necessary. As the research has been more intensive and the argumentation more explicit in L1 acquisition to date (see, e.g., Bohannon, MacWhinney, & Snow, 1990; Gordon, 1990; Grimshaw & Pinker, 1989), the issues raised and empirical findings in that debate will be briefly reviewed first so that they can serve both as a framework for discussing the more recent and sparser L2 research, and as an indication of some of the work that is still needed.

Negative Evidence in L1 Acquisition

Demonstrating the *existence* of negative evidence involves showing that something in the learner's linguistic, conversational, or physical environment reliably provides the information necessary to alert the learner to the existence of error. Clear evidence might take the form of a consistent, categorical difference in the behavior of interlocutors following grammatical and ungrammatical utterances by the learner, such as topic-continuing moves and smiles after grammatical speech,

and puzzled looks and clarification requests after errors. Repeated unexpected outcomes, communication breakdowns, negative affective reactions, and interlocutor repetitions with questioning intonation or abnormal stress might also satisfy the test. In a language teaching classroom setting, consistent overt error correction could be expected.

L1 researchers who have sought such evidence in caretaker–child conversation have reported mixed findings. Brown and Hanlon (1980) found no difference in the ratio of sequiturs and nonsequiturs (indicating lack of comprehension) or in affective contingent approval in parental responses following their children's grammatical and ungrammatical utterances. Hirsh-Pasek et al. (1984) also reported no difference in the expression of approval. They found parents of 2-year-olds showed a small difference in the proportion of their children's grammatical and ungrammatical utterances they repeated (including expanded)—12% and 21%, respectively—but there was no difference in the same measure for parental responses to children aged 3–5. Demetras, Post, and Snow (1986) found slightly more parental exact repetitions and topic continuations following four 2-year-olds' grammatical utterances, and slightly more clarification requests following their ungrammatical ones, but no relationship between grammaticality and several other measures. A clearer differentiation was observed with 2-year-olds by Penner (1987), however, who found that mothers and fathers repeated their children's grammatical utterances more than their ungrammatical ones and recast their ungrammatical utterances roughly twice as often as their grammatical ones. Bohannon and Stanowicz (1988) reported similar findings, and showed that about 90% of exact repetitions followed children's grammatical utterances; about 70% of recasts and expansions followed their ungrammatical ones; a third of ungrammatical utterances elicited parental recasts and expansions (two-thirds did not); and children were eight times more likely to repeat recasts of their ungrammatical utterances than exact imitations of their grammatical ones. Farrar (1992) found corrective recasts followed 22% of children's ungrammatical utterances, and that children imitated the corrected morpheme two or three times as often after corrective recasts than after any other kind of parental response providing positive evidence. Furrow, Baillie, McLaren, and Moore (1993) reported more strict repetitions, move-ons, and no responses after children's grammatical utterances in three mother–child dyads, and more clarification questions and expansions or recasts after ungrammatical utterances. They also demonstrated that a portion of such differential responding was to the grammaticality of child speech, independent of its ambiguity. The direction rather than the degree of differential treatment of grammatical and ungrammatical speech across these latter studies is more significant, because researchers sometimes used different operational definitions of error or some parental response categories, or both.

Skeptics, like Grimshaw and Pinker (1989) and Gordon (1990), reject these findings as evidence against the need to posit a strong innate endowment, and are

at most willing to countenance a possible facilitating role for conversational assistance in language acquisition. They point out that not all language learning occurs at age two, that none of the differences in responses to grammatical and ungrammatical speech are categorical, and that there is no evidence that children can register relative frequency data concerning the (apparent) acceptability of what they say in order to interpret such information over time.

Addressing the frequency issue, Bohannon et al. (1990) deny that differences in responses to grammatical and ungrammatical speech need to be categorical, citing evidence to the effect that corrective feedback on less than 25% of trials is sufficient to produce accurate concept learning. The important factor, they write, is not that each trial receives clear feedback, but that the preponderance of the evidence over time clearly indicates the correct learning target. Farrar (1992) notes that both his 22% recast rate after ungrammatical utterances and the 33% recast and expansion rate of Bohannon and Stanowicz (1988) would meet this criterion, especially when it is considered that additional ungrammatical utterances elicit other types of negative feedback, such as clarification requests. Bohannon et al. (1990) further suggest that something like Wexler and Culicover's (1980) uniqueness principle, Clark's (1987) principle of contrast, or MacWhinney's (1987, and elsewhere) competition principle operates in conjunction with negative evidence. With some differences among them, the principles assume that there is only one means of expressing a given meaning, or one form for one function. Thus, when a learner's version of the TL contains two or more forms for the same function, the learner assumes only one is correct. Under MacWhinney's formulation, if competition between forms is a zero-sum game, with gains for one meaning losses for the other(s), subsequently encountered positive instances of the correct form (which will usually be much more frequent or even the only version) in the input, will not only serve to strengthen that form, but also to weaken the competing one(s). In this sense, interlocutor responses to ungrammatical speech are not the only source of negative evidence: "each piece of positive evidence for Form A is equivalent to a piece of negative evidence for Form B" (Bohannon et al., 1990, p. 223). (For applications of the uniqueness principle to L1 acquisition and to L1 attrition, see, respectively, chapters 16 by Andersen and Shirai and 18 by Seliger, this volume.)

To demonstrate not only that negative evidence exists, but is *usable,* and thereby to meet Pinker's second requirement, it must be shown that learners notice the feedback, and perceive it for what it is. The problem here is that much negative evidence takes the form of partial repetitions, and such repetitions also serve as expressions of agreement, confirmations that a message has been understood, and other functions in the same conversation. The fact that an utterance is intended as a correction, therefore, does not necessarily mean that a learner will perceive it that way. From a learner's perspective, interlocutors might be repeating part of an utterance quizzically because they did not catch all of it, because the meaning was

clear but surprising, because there is another way of saying the same thing, because they disagree, because something was linguistically awry, or for multiple reasons, as shown in the following (constructed) L2 example concerning adverb placement:

(9)

NNS: When I was a child in France I drank every day wine with my meals.

NS: (astonished) Really? You drank wine *every day?*

NNS: Sure. Wine with water.

Even if a learner correctly perceives an utterance as a correction, there is still the problem for any kind of cognitive comparison or hypothesis-testing theory (e.g., Bohannon & Stanowicz, 1989; Nelson, 1987) of whether a learner can hold both the original errorful utterance and the interlocutor's response in memory long enough to compare them, and if that is (sometimes) possible, the additional question of whether the identity of the error will be clear. Was pronunciation the problem, for example, or were one or more parts of the lexis or grammar wrong? Because *use* entails *usability,* we will move directly to Pinker's third criterion.

Critics claim it is also difficult to show that learners *use* any negative evidence that is available. First, the literature contains amusing anecdotes of children who seem oblivious to repeated explicit correction, and it is claimed that correction can only be recognized as such, and so even potentially be used, when children attain metalinguistic awareness (Birdson, 1989). Second, when child speech development does appear to benefit from corrections, recasts, or some other intervention, Grimshaw and Pinker (1989) argue, this does not constitute unambiguous evidence of the effect of the negative feedback, because the utterances containing the correction simultaneously provide positive evidence of the item concerned.

Neither of these arguments withstand scrutiny, however. The anecdotes, first of all, are of questionable relevance. Quite apart from the fact that they are of uncertain frequency, they presumably show nothing more or less than that processing constraints will always limit the evidence, positive or negative, from which a child or adult learner can benefit. Input must be within a reasonably close developmental distance from an L1 or L2 learner's current proficiency level if it is to be comprehensible, and therefore usable (Meisel, Clahsen, & Pienemann, 1981; Pienemann, 1989). Children imitate emergent structures more frequently than already acquired or wholly unfamiliar ones (Bloom, Hood, & Lightbown, 1974). Examples of particular children being unable to use particular pieces of negative evidence, in other words, do not show that those or other children cannot or do not use negative evidence.

The second suggestion, that negative evidence really works (only) as positive evidence, is also dubious. If the data showed only that children who received negative feedback, such as recasts and expansions, on particular structures outperformed children who received less positive evidence on those structures, more general exposure to the same structures or more positive evidence on different structures (e.g., Malouf & Dodd, 1972; Nelson et al., 1973; Nelson, 1977; Nelson, Denninger, Bonvillian, Kaplan, & Baker, 1984), the results would indeed be susceptible to the alternative interpretation that the negative feedback provided in the various treatment conditions worked by offering additional models of the target structures (i.e., positive evidence). What has been demonstrated, however, is more than that. Controlled comparisons have shown that, in otherwise natural conversation, recasts, (i.e., adult responses that add morphosyntactic or semantic information to some component of a child's preceding utterance without changing its essential meaning) are more successful than (1) equal numbers of noncontingent models of control structures for the same children or than (2) models of the same structures in comparable children (Baker & Nelson, 1984; Farrar, 1990; Nelson, 1988, 1991; Nelson et al., 1984). In other words, children who receive additional positive evidence, either in the general input or as models, are outperformed by comparable children who receive equivalent amounts of data in the form of negative evidence, specifically negative feedback, following their ungrammatical speech.

Recasts are utterances that rephrase a child's utterance by changing one or more sentence components (subject, verb, or object) while still referring to its central meanings. Following a child's utterance, "Jimmy eat all the bread," a simple recast, in which one component is changed, might be "That's right, Jimmy ate all the bread." Following "Jimmy watch TV," a complex recast, in which two or more components are changed, might be "Yes, Jimmy's watching television, isn't he?" In two experimental intervention studies with eight children ranging in age from 2.6 to 3.10 and in mean length utterances (MLU) from 3.07 to 4.81, adult recasts of the children's utterances that contained the target structures were found to speed up productive use of passives, relative clauses, and previously nonused auxiliaries, to do so more than models of the same items, and to do so more when the child's rather than the experimenter's utterances were recast. The children whose use of the structures was stimulated were also younger than those who usually attempt them (Baker & Nelson, 1984). The advantage for recasts over models (which also improved performance), and for recasts of the children's over the researchers' utterances, Nelson points out, suggests that it is the opportunity for cognitive comparison by the child of his or her own utterance with the semantically related adult version, and not just hearing new forms in the input, which is useful.

Four properties are confounded in recasts: (1) reformulation, (2) expansion, (3) semantic contingency, and (4) position (following the child's utterance), and could each or in combination account for the relationship. Farrar (1990) noted,

however, that the four properties occur in unique combinations in other parental moves in caretaker–child discourse; recasts (all four), expansions (2, 3, and 4), topic continuations (3 and 4), and topic changes (4 only). In an ex post facto correlational design, Farrar compared the relative utility of each move containing a specific morpheme in promoting use of that morpheme in 12 mother–child pairs recorded twice over a 6-month period. After any effects of the other moves on those morpheme's development were partialed out, recasts (the only moves to involve reformulation of the child's utterance) were found to be strongly related to the development of two bound morphemes, plural *s* and present progressive *-ing*. Expansions and topic continuations were similarly positively associated with regular past tense and copulas. Topic changes were not positively associated with development. With the exception of a presumably spurious correlation between recasts of copulas and use of third-person singular *s*, there were also no effects for particular or general response types on any of the other morphemes, suggesting very specific relationships between input and acquisition not easily accounted for by the general provision of positive evidence.

One possible reason for the effectiveness of recasts is that children imitate them two or three times as often as other parental responses (Bohannon & Stanowicz, 1988, 1989; Farrar, 1992). This is true provided they are not too far removed from the child's initial attempt, as is usually the case. Adults recast child utterances with one error more often than those with multiple errors, and recasts with one added or corrected morpheme are in turn more likely to be imitated by the child than recasts with two or more such morphemes, which are often ignored (Bohannon & Stanowicz, 1989; Farrar, 1992; Nelson et al., 1984). Recasts that involve only one change presumably make comparison of the original and corrected utterance easier for the child. Imitation has independently been claimed to play various useful roles in language development (Speidel & Nelson, 1989). Importantly, Farrar found that children were more likely to imitate corrective recasts than noncorrective recasts, exact repetitions, topic continuations, or topic changes, despite the fact that exact repetitions tend to be syntactically simpler. Farrar noted (1990, p. 65) that this suggests they respond to the negative evidence, not simply to a recast's imitative quality. Corrective recasts appear to be more salient to children; they attend to, notice, and imitate them more than other response types containing identical linguistic information, satisfying Pinker's third condition. Although immediate learner incorporation of new grammatical items speaks only to short-term effects (Birdsong, 1989), earlier findings (Baker & Nelson, 1984; Farrar, 1990; Nelson, 1991; Nelson et al., 1984) suggest that the relationship between recasts and subsequent development is lasting.

Pinker's fourth and final requirement is to show that negative evidence is *necessary*. At first sight, this looks well motivated, given the well-known resilience of language acquisition in the face of variable input and variable provision of conversational support by individual caretakers across families of different social

classes (Lieven, 1978), as well as for male and female children and firstborn and later children. More critically, some ethnographic studies have described communities in which certain styles of adult–child conversation believed to be advantageous for language development are supposedly culturally inappropriate, and so not used, with no obvious harm to child language development (Heath, 1983; Ochs, 1982; Ochs & Schieffelin, 1984). If valid, such findings would automatically reduce negative evidence from a necessary to, at most, a facilitative role.

The argument is again controversial, however. Just as anecdotes describing instances of nonuse of parental corrections show neither that such results are general nor that the children concerned do not benefit from negative evidence on other occasions, so reports of community members not utilizing certain styles of caretaker talk have to be viewed in context. In some cases (e.g., Western Samoa), elder siblings, not adults, are reported to be the principal caretakers, making reports of what does not occur in adult–child conversation less relevant than descriptions of older–younger child talk. Furthermore, as pointed out when these studies first began to appear, although some communities apparently eschewed use of simple codes with children, there was sometimes evidence that caregivers did make interactional modifications of the kind now under discussion, and it was these, not simple input, that were relevant to acquisition (Long, 1981a). In the Western Samoan case, for example, although excerpts from mother–child conversation reported by Ochs (1982) did not show use of simplified speech to children, they did show examples of repetition and other potentially facilitative response types. This has since proven to be the case with the language socialization practices of other culturally very different peoples, such as the Kaluli of Papua New Guinea (Ochs & Schieffelin, 1984; Schieffelin, 1979, 1987). Some of those groups also employ highly conventionalized, quasi-instructional speech events with language-learning children, such as the Kaluli *elema* (roughly, Say it like that), a form of elicited imitation (Schieffelin, 1979, 1987), and in Malaita in the western Solomon Islands, the Kwara'ae *fa'amanata'anga* (teaching of knowledge and abstract skills) for teaching children reasoning skills and cultural values (Watson-Gegeo & Gegeo, 1990).

In the case of the African-American community described by Heath (1983), Bohannon et al. (1990) noted that the reported opinion of a single community member that repeating children's utterances is pointless is not the same as showing that members of the community share this view or that their behavior with children bear it out if they do. Nor would the unavailability of a particular form of feedback to some children render it useless to children who receive it or show that no form of feedback is necessary. Snow (1989) has also argued that the language acquisition process has redundancy built into it such that the absence of one environmental factor of relevance can be compensated for by another, and Bohannon et al. (1990) suggested that even if the community described by Heath really does

not repeat what its children say, it can be expected to ensure that they are clear and comprehensible in other ways.

Empirical support for a role for negative evidence in L1 acquisition is far from sufficient (cf. Moerk, 1991). Positive correlations between various types of semantically contingent parental responding moves, such as expansions and extensions, and language development have been few and somewhat erratic both within and across studies (Barnes, Gutfreund, Satterly, & Wells, 1983; Gleitman, Newport, & Gleitman, 1984; Hoff-Ginsberg, 1986; Scarborough & Wyckoff, 1986), and there are still relatively few data of the kind reported by Nelson (1977), Baker and Nelson (1984), and Farrar (1990), showing specific effects of recasts over time on the items they targeted. Also, if it is really true that children never make errors on some items, as innatists often assert, then as Farrar (1992) noted, negative evidence could not be involved there, at least. That would be consistent with claims for innate knowledge of constraints on language, or else with a radically different view from Chomsky's of the language-learning process or of end-state grammatical knowledge. Finally, and perhaps most seriously, recast items are often language-specific and not of the order of complexity or abstractness of most supposed principles of Universal Grammar (UG). Hence, although negative feedback is of potentially great interest as a mechanism by which some aspects of languages may be learned, research must focus on some of the tougher areas of syntax and pragmatics before it is likely to interest skeptics in the innatist camp.

Negative Evidence in L2 Acquisition

Thus far, the discussion has primarily concerned L1 acquisition, where it has been argued that various forms of implicit correction, and recasts in particular, play an important facilitative role in development. The L2 picture is less clear, as researchers have for the most part restricted the scope of their studies to overt oral error correction during classroom lessons or written feedback on student writing (for review, see Chaudron, 1987, 1988). Although important in helping to determine the effects of formal instruction on IL development, neither case speaks to the ability of learners to perceive and utilize implicit corrective feedback during spontaneous communicative language use. Further, L2 researchers who have sought evidence of learners modifying their output as a result of feedback on error have tended to limit their focus to the short-term, usually immediate, effects, perhaps because L2 acquisition among instructed adult subjects progresses rapidly in the early stages and because of the difficulty of controlling for outside exposure in longitudinal studies, even in foreign language environments.

Where usability and use are concerned, some studies show that metalinguistically mature adult classroom learners, who might be expected to be on the lookout for form-focusing devices, whether proactive or reactive, often do not perceive them as such when working with an NS on a problem-solving task (Hawkins,

1985) or even during classroom lessons with a primary focus on language as object (Slimani, 1992). Most researchers report students not only noticing corrections, however, but benefiting from them—in the short term, at least (Chaudron, 1988). Salica (1981) found that adult ESL students responded correctly to 64% of teacher corrective feedback moves, and Wren (1982) that an advanced adult ESL student was able to self-correct 14% of her errors, but 83% of them after teacher treatment during individual tutorial sessions with the researcher. In a study of French immersion classrooms, Chaudron (1977) showed that, as compared with simple repetition of the correct model, teacher feedback in the form of a reduced version of the student's utterance to help locate the error increased the rate of correct student responses to error treatment by about 15%, that adding emphasis (questioning tone or stress) increased correct responses by about 20%, and that a combination of reduction and emphasis was most effective of all. Research on ESL by francophone adolescents in Quebec (Lightbown & Spada, 1990; Spada & Lightbown, 1993; White, 1991; White et al., 1991) has shown at least a temporary advantage for intact groups of students whose attention is drawn to a targeted construction by form-focused activities or error correction over groups experiencing the same amount of natural classroom exposure. In some cases, however, the advantage may be due in part to the rarity of the forms concerned (e.g., frequency adverbs), in incidental classroom input, a fact that may also account for its failure to survive intervals of noninstructional focus before delayed posttests in some studies.

Nonclassroom studies are more revealing because spontaneous conversation with no metalinguistic focus *before* negative evidence is provided is the norm for most L2 learners and the only experience available to many. NSs were found very rarely to attempt overt correction of NNS errors in 23 informal 20-minute conversations outside classrooms (Chun et al., 1982), where it would usually be sociolinguistically inappropriate and also difficult, because interlocutors are focused on communication. Using the same database, Brock, Crookes, Day, and Long (1986) found no differential effect for implicit and explicit feedback on error, and minimal evidence of NNSs incorporating such feedback in their next utterance following the NS feedback move. Inside classrooms, the fast pace of typical language lessons means that teachers understandably fail to notice many errors, ignore others if they are not the current pedagogic focus, and (paralleling the L1 acquisition findings) often "correct" those to which they do respond inconsistently and also ambiguously (e.g., by using exact repetition of the target utterance both when confirming a correct student utterance and correcting an incorrect one) (Allwright, 1975; Fanselow, 1977; Long, 1977). Crookes and Rulon (1988) studied incorporation of corrective feedback as a function of the type of task upon which 16 NS–NNS dyads were engaged. They found that two collaborative problem-solving tasks generated four or five times more corrective utterances after NNS errors and more negotiation for meaning than free conversation by the same pairs. Use of

corrective feedback was only higher on one of the two tasks than in free conversation, however, apparently that involving most new vocabulary for the learners and hence more opportunities for incorporation of new words.

In a small-scale study extending Farrar's (1992) analysis to L2 acquisition, Richardson (1993) examined 15-minute free conversations by three adult NS–NNS dyads. Classifying NS responses to learners' grammatical and ungrammatical utterances containing any of seven classes of target grammatical morphemes into Farrar's four categories—corrective recasts, noncorrective recasts, topic continuations, and topic changes—she then looked at NNS reactions to each type of response. Paralleling the L1 acquisition findings, NNSs were found to be (here, 1.6 to 4.5 times) more likely to imitate the correct grammatical morpheme after a corrective recast (negative feedback) than after any of the other three responding moves (positive evidence). It was generally the more easily remediable ungrammatical utterances that the NSs recast; only 13% of corrective recasts were responses to NNS utterances with multiple errors, and there were only two cases where a NNS imitated recasts containing two corrections. In other words, again as in L1 acquisition, NSs provided fewer recasts with multiple corrections, and NNSs were less likely to use them when they occurred. The higher NNS tendency to imitate corrective recasts could have been due to the negative feedback they provided or because they contained a partial imitation of what the NNS had said. These two factors were distinguishable by comparing NNS imitations of corrective recasts and noncorrective recasts, because the latter also contained an imitative component but provided positive evidence of the target morphemes. Richardson found that the NNSs imitated 42% of corrective recasts compared with 26% of noncorrective recasts, suggesting that they were indeed responding at least in part to the negative evidence in corrective recasts rather than to their imitative component. In sum, although based on a very small sample and corpus, Richardson's study provides preliminary evidence to satisfy Pinker's third criterion: i.e., evidence consistent with the claim that negative feedback in L2 acquisition is usable and is used, although as yet with unknown impact on long-term acquisition.

Similar findings have been obtained by Oliver (in press). As part of a larger study, Oliver analyzed child NS reactions to their NNS interlocutors' ungrammatical turns, and the child NNSs' use of the NS feedback, in 8 (8–13-year-old) dyads performing two picture-description tasks. With regard to NS reactions to NNS error, of 283 error turns in the corpus, 39% were ignored by the NSs, and 61% received implicit negative feedback of some kind, either recasts (22%) or negotiation, such as clarification requests and confirmation checks (39%). Oliver found three relationships between NNS error type and NS response: (1) Errors involving incorrect or omitted auxiliary, copula, pronoun, word order, word choice, word, or subject tended to elicit NS negotiation. Singular/plural and subject–verb agreement errors were more often recast. There were no clear differences in NS reactions to article, tense, and obvious pronunciation errors. (2) Semantically am-

biguous (opaque) utterances were more likely to be recast (cf. Furrow et al., 1993). (3) The 'opaque-negotiate' and 'transparent-recast' pattern was clearer when single- and multiple-error turns were distinguished: 78% of negotiations and 31% of recasts were in response to turns containing two or more errors; 22% of negotiations and 69% of recasts were in response to single-error turns (cf. Richardson, 1993). With reference to NNS use of the feedback, Oliver found the NNSs incorporated 10% of all recasts, and over one-third when given an opportunity to do so and when incorporation was appropriate. Oliver showed that incorporation by the NNS was impossible 16% of the time because NSs continued their turn rapidly immediately following an utterance containing a recast, and inappropriate 55% of the time, e.g. because the recasts occurred in the form of yes/no questions. Examining non-use of information in recasts in this way constitutes an important methodological advance for L1 and L2 research, for it suggests that learners may well use substantially more of the negative feedback they receive than is revealed by immediate incorporation, the measure employed in most L1 and L2 studies. Neither Richardson's nor Oliver's studies provide unambiguous evidence of use (as opposed to usability), of course, since longitudinal studies or use of pre- and posttests in cross-sectional designs would be required for that.

The relative utility of models and what might best be called "pseudo-recasts" has been investigated in two innovative classroom studies by Herron and Tomasello of what they call the Garden Path technique. Herron and Tomasello (1988) found that adult learners of French as an L2 who were shown examples of a structure or lexical item so that they formed a correct generalization based on a pattern in the L2 data, and who were then induced to make errors by being shown another example to which the rule should logically have applied but did not, and who then had their overgeneralization errors explicitly corrected, learned better than comparable subjects who were given a series of correct examples of the structure. Tomasello and Herron (1989) replicated this finding with induced errors attributable to L1 transfer (i.e., interlingual errors), as opposed to intralingual errors in the earlier study. Herron and Tomasello claim that their results are explained by Nelson's (1981, 1987) rare event cognitive comparison theory of language acquisition, which holds that recasts are especially useful for children to compare their own speech against native models because they occur immediately after the child's incorrect utterance, in the same discourse context, and with the same semantic context.

This claim was criticized by Beck and Eubank (1991) on the grounds that neither Tomasello and Herron (1989) nor Nelson had provided data to satisfy Pinker's four tests for the functioning of negative evidence in language development, particularly for the claim that negative evidence is a requirement for language acquisition, and because of alleged methodological inadequacies in the transfer study. Tomasello and Herron (1991) responded that their studies concern negative feedback, not negative evidence in a strict Learnability Theory sense, and mostly

structures that involve lexical choice and article use (i.e., items considered part of the semantic–pragmatic aspect of language), which lie outside Chomskyan UG or "core grammar." They further specified that their claim is for the beneficial effect of negative feedback, not its necessity.

Although Tomasello and Herron indeed failed to address several issues required of an argument for a role for negative evidence, this is less important in light of the more recent child language data summarized above, which should satisfy Pinker's (and Beck and Eubank's) concerns about its availability, perception, and usability. What neither Tomasello and Herron nor Beck and Eubank discuss, on the other hand, is the external validity of the Garden Path findings. Tomasello and Herron (1989, p. 392) point out that the conditions that Nelson (1987) argues make negative feedback, particularly recasts, so important in L1 acquisition hold in the Garden Path technique, too: (a) occurrence "immediately after a child's incorrect formulation, (b) in the same discourse context, and (c) with an attempt to match the child's intended meaning." After citing unpublished data showing that provision of recasts in their L1 form does not seem to work in the classroom, however, they go on to assert the relevance of Nelson's (1987) cognitive comparison theory in explaining their results.

Tomasello and Herron's position deserves closer examination. In spontaneous noninstructional talk:

> (A) recast occurs when, in reply to the preceding utterance of the child, the mother maintains reference to the same meaning but syntactically changes one or more of those sentence components: subject, verb, or object. (Baker & Nelson, 1984, p. 5)

In the Garden Path technique, however, the "recasts" (1) are not triggered by an error occurring as part of learners' attempts to communicate, (2) are provided to metalinguistically aware subjects, (3) occur when the attention of both parties is already focused on an isolated target form for the explicit purpose of language learning, not in spontaneous conversation when the interlocutors are primarily focused on meaning, (4) are delivered in the form of explicit correction (the correct forms being written on the blackboard above the students' incorrect ones and commented upon by the teacher), not incidentally, and (5) are accompanied by opportunities for unhurried visual inspection and cognitive comparison. Although Farrar (1992) showed that it was reformulation, not expansion, semantic contingency, or discourse position, that distinguished recasts from other less beneficial forms of maternal feedback to children, that does not mean that the message-initiation quality of the learner's triggering utterance outside classrooms is irrelevant. All four types of feedback compared by Farrar shared that feature. Nor does the Garden Path research address the issue of the saliency of recasts to learners in noninstructional talk (the only L2 experience for the majority of L2 learners). Do

adult L2 learners benefit incidentally from recasts or other forms of implicit, "off-record" negative evidence when they encounter them in spontaneous conversation unaccompanied by metalinguistic explanation or opportunities for unhurried visual comparison?

In a study designed partly to answer that question, but which maintained sufficient control to permit a possible causal interpretation, Mito (1993) randomly assigned 27 adult NSs of English enrolled in a second semester course in Japanese as an L2 (JSL) to form five groups. Subjects were pretested on two Japanese target items, a locative construction and adjective ordering, using one of two equivalent versions of an oral picture-description task, and were found not to know either. In a within-subjects, repeated measures design, the 18 subjects in the four treatment groups then played one of two variants of each of two communication games (involving manipulation of objects by researcher and subject separated by a screen), each game designed to elicit one of the target constructions, during which they received either six models (on a prerecorded audiotape) or six recasts (live) of the structure from the researcher, before doing a second version of the picture-description task as a posttest. Training exemplars (modeled or recast) of the target structures and pre- and posttest items were different. Structures (locatives and adjective ordering) and treatments (models and recasts) were crossed, such that each subject received models of one structure and recasts of the other. Structures, treatments, and pre- and posttest forms were counterbalanced. The nine subjects in the control group did the same tests and practiced writing *kanji* for a period equivalent to the other four groups' treatment sessions. All sessions, including testing, were conducted individually, lasted 30 minutes, and were audio-recorded. Transcripts were checked to ensure that equivalent numbers of models and recasts had been delivered to each subject. The posttest showed no learning of either structure in the modeling condition or by the control group, whereas there was a small but statistically significant improvement on adjective ordering and locative structures by 6 of the 18 subjects in the recast condition. Mito cautions that the learnability of the two structures for students of her subjects' Japanese proficiency was assessed impressionistically on the basis of pilot-testing of the procedure and examination of students' textbooks, not empirically established developmental sequence research in JSL (which is minimal), and that this may have obfuscated the effects of one or both treatments. (Even in the recast condition, the structures were apparently too difficult for most subjects, 12 failing to learn either.) Also, some subjects spontaneously echoed some of the recasts, thereby obtaining additional output opportunities that may have favored the recast condition. With these caveats in mind, Mito's results are consistent with those from the L1 acquisition literature in suggesting the usability of negative evidence in general and recasts in particular by adult L2 learners, and the superiority of recasts to models. Further research of this sort is clearly needed.

Another limitation of the Tomasello and Herron studies concerns the indeter-

minate nature of the learning achieved by the treatment groups. Carroll, Roberge, and Swain (1992) pointed out that the targeted forms were absolute exceptions to taught rules, exceptions all learners need to memorize. It is not clear whether the Garden Path technique was being used to teach rules or restrictions on rules, or simply to draw learners' attention to the exceptions, about which information would in any case be independently available as positive evidence in the input. Accordingly, Carroll et al. (1992) conducted a study of the effect of explicit corrective feedback on the learning of French morphological generalizations by adult speakers of English. Thirty-nine intermediate and 40 advanced learners were randomly assigned to one of two groups. After a nine-item training session, subjects were shown flashcards on which were written French sentences containing a verb, and related sentences in which they had to supply the missing noun form derivable from that verb. The nominal form required either a short or long form of the stem plus either *-age* (39 cases), *-ment* (38 cases), or some other suffix (13 cases), choice among which in French is grammatically conditioned (simplifying a little) by whether or not a verb is of the *-er* or *-ir* class and is transitive or reflexive. Subjects in the treatment group received correction on any errors they made in the first 45 instances, which also included four completely exceptional items of the kind targeted in the Tomasello and Herron studies, but no correction in the second 45, during which items turning on the *-er/-ir* distinction were first introduced. Control group subjects received the same 90 items, but with no correction at all. The inclusion of the four exceptional items during the first (feedback) phase further allowed the researchers to compare the effects of correction of absolute exceptions with correction of items based on one (*-er*) verb class on items based on another (*-ir*) class (i.e., on learners' ability, if any, to generalize the effects of feedback. Carroll et al. tested subjects immediately and 1 week later using the 45 items from the feedback phase. Experimental subjects outperformed controls, showing the beneficial effects of correction, with advanced learners retaining more information than intermediates after a week. They had failed to induce morphological generalizations, however, seeming instead to have used correction to learn individual lexical items.

The troubling implications of these findings for any inductive language learning theory, in which negative feedback would have to play a role, were somewhat ameliorated by the results of further research showing that adults could learn from negative feedback and also *generalize* the knowledge to new cases. Using similar materials and procedures in another tightly controlled laboratory study, Carroll and Swain (1993) examined the effects of negative feedback on 100 adult Spanish speakers' learning of the English dative alternation in such sentence pairs as *Mary found a job for Antonio* and *Mary found Antonio a job.* There were four treatment groups: Explicit hypothesis rejection (subjects told they were wrong and given an explicit rule statement every time they made an error), Explicit utterance rejection (subjects simply told they were wrong every time they made an error), Modeling/

Implicit negative feedback (subjects given a reformulated correct response every time they made an error, but no rule statement), and Indirect metalinguistic feedback (subjects asked if they were sure their response was correct every time they made an error, but given neither a model nor a rule. All four treatment groups generally outperformed the (no feedback) control group on both treatment verbs and new verbs on an immediate posttest and on a delayed posttest a week later. The Explicit hypothesis rejection group did best, often outperforming the other treatment groups, as well, followed by the Modeling/Implicit negative feedback group. Carroll and Swain warn that the Explicit hypothesis rejection group had more time on task (looking at the cards) than other groups because the metalinguistic explanation often took longer, and that all treatment groups may have looked at the stimuli on the cards longer than the control group for the same reason. Furthermore, although the results of this study at least leave open the possibility that adults can learn abstract linguistic generalizations from either direct or indirect feedback, the controlled circumstances under which they did so made induction a simpler task than that facing learners in the real world. The laboratory subjects (1) did not have to provide the meaning and syntactic form of sentences, which were both done for them, and so could attend to language as object; (2) knew all their utterances were categorically either correct or incorrect, and (3) knew they would receive, and received, feedback always and only following an error.

In sum, various forms of negative evidence, particularly overt corrective feedback following learner error, are well documented in instructed L2 acquisition. However, the status of negative feedback in natural NS–NNS conversation, where a metalinguistic focus is lacking and where attempts at overt error correction rarely occur, is the theoretically and practically more interesting question. Two small studies (Oliver, in press; Richardson, 1993) show the existence and usability of negative evidence in spontaneous NS–NNS conversation, with patterns and proportions both of differential NS responses to grammatical and ungrammatical learner utterances, and of learners' differential reactions to corrective recasts and other response types, approximating those in caretaker talk. The usability of L2 corrective feedback, demonstrated by evidence that learners perceive the feedback for what it is, is seen in NNSs in the Oliver study incorporating between 10% and over 30% of recasts, depending on the analysis used, and in NNSs in the Richardson study imitating roughly 40% of corrective recasts compared with roughly 25% of noncorrective recasts, and being roughly two to four times more likely to produce a correct target morpheme after corrective recasts than after other NS responses. Evidence of use is proving no easier to come by than in L1 acquisition. There is the difficulty of (1) preempting a metalinguistic focus, and (2) allowing sufficient input and time for specific learning effects to become apparent, while (3) maintaining control of the linguistic environment in an experimental study, compounded by (4) the problem of matching target structures to one another and

to adult learners' current proficiency and processing abilities. Some limited evidence exists of use, however, and of the relative efficacy of recasts over models (Carroll & Swain, 1993; Mito, 1993), and further studies of the issue are currently in progress. A facilitative role for negative feedback in L2 acquisition seems probable, and, as White (1989, 1991) has claimed, its necessity for learning some L2 structures is arguable on logical learnability grounds.

V. NEGOTIATION FOR MEANING AND ACQUISITION

A. The Role of Conversation

In a pioneering exploration of the issue in the L2 acquisition literature, Hatch (1978) urged L2 acquisition researchers to consider the proposition then emerging from L1 work (Atkinson, 1979; Ervin-Tripp, 1976; Keenan, 1974; Macnamara, 1972; Scollon, 1973) that, rather than grammatical knowledge developing in order to be put to use in conversations at some later date, "language learning evolves *out of* learning how to carry on conversations" (Hatch, 1978, p. 404). (Most language teaching syllabi and "methods" assume the reverse.) Hatch (1983) cautioned, however, that some aspects of conversation might actually inhibit learning. For example, "(M)istakes in the marking of verbs . . . would not be caught by when? questions. Such question corrections would more likely elicit a time adverb rather than a verb correction for morphology" (Hatch, 1983, p. 432).

Sato (1986, 1988, 1990) examined these ideas as part of a larger longitudinal study of naturalistic L2 acquisition motivated by Givón's claims concerning the shift from presyntactic to grammaticized speech in language change (e.g., Givón, 1979). Sato's data consisted in part of spontaneous conversations between NSs and two Vietnamese brothers whose English development she observed each week for a year. In the area of emergent syntax, Sato found some examples comparable to those in L1 acquisition (Ochs, Schieffelin, & Platt, 1979) of collaborative complex propositions across utterances and speakers, as with the precursors to adverbial and relative clauses in (10) and (11):

(10) Than: vɪtnam dei (bli) kɔ :
'[In] Vietnam they (play) cards'
NS: They what?
Than: pleɪ̯ kɔ :
'play cards'
NS: They play cards?
Than: yæ wɛn wɛn krismɛs
'Yeah, when [it's] Christmas

(Sato, 1988, p. 380)

(11) Tai: hi lɷk əm əm-
'He's looking, um'
Than: æt mæn
'At [the] man
Tai: æt mæn hi hi smo^{w}kiŋ
'At the man [who is] smoking'

(Sato, 1988, p. 380)

Such cases were rare during the first year, however, perhaps due to the limited overall proficiency of the children, who were near beginners when the study began.

When it came to inflectional morphology, Hatch's caution proved well founded. Sato showed how the brothers initially used conversational scaffolding, specifically their interlocutors' prior establishment of reference to a past event to compensate for their lack of overt inflectional past time marking. Even severe communication breakdowns failed to elicit learner attempts at the missing verbal morphology:

(12)

NS: Oh, Mary said that you went to, um—went to a game by the Fever?

Tai: noụ tan hi go yɛt.
no-Thanh-he-go-yet.

You didn't go yet? To the Fever?

Tai: wat?
What?

Did you go to see the Fever play soccer?

Tai: yɛs.
Yes.

When was that?

Tai: nat nat naụ
not-not-now

Oh, uh—later? Oh, I see. Who else is going?

Tai: tan hi go ɪn də pɪɯ
Than-he-go-in-the [pɪɯ]

(Sato, 1986, p. 36)

Later, like adult learners of German (Meisel, 1987), the brothers moved to alternative surrogate systems of their own, such as the use of temporal adverbials ('Yesterday, I go . . .') and order of mention, but neither boy progressed very far with past time inflectional morphology during the first year of the study.

In an explicit discussion of the issue, Sato (1986) proposed that conversation is

selectively facilitative of grammatical development, depending on the structures involved. The beneficial effects of conversational scaffolding and situational knowledge on communication makes overt past time marking on verbs expendable in most contexts, which may hinder acquisition by lessening the need to encode the function morphologically in speech. (Although it is true that not needing to produce an item may not impede acquisition, or encoding of the item in the underlying grammar, failure to perceive a gap, or mismatch between output and input is arguably less likely to promote IL change, at least, than awareness of a communication breakdown.) There is some limited evidence that conversation nourishes emergent L2 syntax, on the other hand (Sato, 1988), most of the few attempts at complex syntactic constructions produced during the children's first year of English occur in a conversational context. Studies of collaborative syntax across utterances and speakers in talk between NSs and adult beginners and NSs and more proficient learners remain serious lacunae in the L2 database. A valuable contribution in this area, however, is Bygate's (1988) study of the ways pairs of adult classroom learners working on problem-solving tasks used intraturn repairs and cooperative dialogue to build syntactically more complex freestanding utterances out of various kinds of shorter, syntactically dependent "satellite units."

The claim that conversation facilitates the emergence of at least some types of grammatical devices is essentially one about learner production. So, too, is a second claimed role for conversation in acquisition, the "Comprehensible Output Hypothesis" (Swain, 1985). Swain suggested that the failure of French immersion students to reach nativelike levels might partly be due to the lack of much genuine opportunity for them to participate in classroom conversation in more than a response mode. Although their receptive skills can reach nativelike standards this way, the ability to decode input using semantic and pragmatic knowledge may inhibit syntacticization (see also Skehan, 1992). Production, on the other hand, can push learners to analyze input grammatically, with accuracy also increased by the negative feedback that verbal hypothesis testing elicits. As suggested by Schachter (1983, 1984, 1986), confirmation checks, comprehension checks, clarification requests, and other triggers of negotiation work can sensitive learners to a need for greater comprehensibility on their part. They can aid acquisition by pushing learners to increase control over forms they have already internalized (Nobuyoshi & Ellis, 1993).

As Krashen (1985, pp. 35–36, 65–67) pointed out, a claim that production is necessary for acquisition is problematic in light of the exceptional cases of individuals who have supposedly learned languages with minimal or no opportunity to speak (Fourcin, 1975; Lenneberg, 1962). (Such cases are not only exceptional, but somewhat poorly documented, it should be noted.) Similarly, R. Ellis (1992) concluded from a review of classroom studies that there was no clear evidence of a positive effect for "controlled" production practice, at least. Ellis noted, however, that such practice might at least raise learners' consciousness of the target

items or of language form in general, possibly leading to a delayed benefit. In sum, a more defensible view is that spoken production is probably useful, as Swain suggests, because it elicits negative input and encourages analysis and grammaticization, but that it is facilitative, not necessary.

There has been a considerable amount of research on "pushed output" in NS–NNS conversation. An early study that sought evidence of modification and incorporation of feedback produced very few examples in a corpus of 23 informal NS–NNS conversations (Brock et al., 1986). The null finding may have been due to looking for incorporation only in NNS utterances immediately following correct NS models, and also to use of informal phatic conversation as the database. Free conversation is notoriously poor as a context for driving IL development for a number of reasons, because the lack of any fixed topics or outcomes permits rapid, superficial treatment of topics and the dropping of any that cause linguistic trouble (Long, 1983c). In contrast, tasks that orient participants to shared goals and involve them in some work or activity produce more negotiation work (Pica, Kanagy, & Falodun, 1993), as do unfamiliar tasks that involve participants in the discourse (Gass & Varonis, 1984; Plough & Gass, 1993) and tasks performed by mixed proficiency dyads in which the lower and higher proficiency NNSs are in the sender and receiver (of information) roles, respectively (Yule & Macdonald, 1990). When working cooperatively on certain kinds of problem-solving tasks (e.g., two-way tasks that are closed—known by participants to have only one or a small number of correct solutions) (Long, 1989, 1990), participants' conversational feet are held to the fire. The nature of the task causes topics and subtopics to be recycled until solutions are reached, producing more negotiation work (Paul, 1991) and as shown by a tendency for some (but not all) two-way tasks to engender a higher ratio of topic-continuing to topic-initiating moves than free conversation, for NSs to provide NNSs significantly more feedback while working on such tasks than in free conversation, and for NNSs to incorporate more of the feedback on some two-way tasks (Crookes & Rulon, 1988).

Pica (1992) provided a detailed review of research in these areas. She concluded that studies such as those by Gass and Varonis (1989), Pica (1987), and Pica et al. (1989) demonstrate a clear contribution of negotiation work to learner reformulations and "pushed output," as Swain proposed, and also suggest the importance of negotiation for revealing relevant information about segmentation possibilities in the L2, and hence about L2 grammatical structure. Both NSs and NNSs modify their output in response to signals of incomprehension or miscommunication, using semantic, morphological, and syntactic changes achieved through repetition, rephrasing, segmentation, and movement—the NSs revealing TL form–meaning relationships in the process.

Pica cautions, however, that it would be a mistake to assume that all negotiation work achieves the desired IL modifications or that learners always take up the opportunities negative feedback provides. To begin with, some interactional

modifications are inherently less likely to trigger modifications than others. A confirmation check allows NSSs simply to confirm or deny, and so is less likely to lead them to reformulate their own or others' utterances than a clarification request, as shown in (13) and (14), respectively:

(13) NNS: I many fren.
NS: [CC] You have many friends?
NNS: Yes.

(14) NNS: . . . you have a three which is . . .
white square of which appears sharp
NS: [CR] Huh?
NNS: . . . you have a three houses . . .
one is no- no- not- *one* is
not square, but with a little bit—a small house.

(Pica et al., 1989)

Moreover, although modifications in the desired direction are often visible, as in (8), above, some negative input, including recasts, is simply ambiguous. For example, intonation and contextual cues may be required, but may be unavailable or too subtle for the NNS to determine whether a NS response is a model of the correct way or just a different way of saying the same thing. And the grammatical information in some feedback is either not noticed or ignored or, at least, is not immediately utilized or perhaps utilizable, as in (15):

(15) NNS: Uh, how—how do you feel Taiwan?
NS: How did I like it?
NNS: Yeah, how do you like it?

(Brock et al., 1986, p. 235)

Finally, Pica (1992, p. 227) pointed out, even modifications of NNS output, as in (8), which involve incorporation of forms in the NS feedback that triggered the modification, cannot necessarily be taken as evidence of sustained IL change. Longitudinal data, at least over several sessions, are needed to make that assessment.

Moving from output and production to input and comprehension, conversation appears to facilitate acquisition in three other ways, with talk that involves participants in negotiation for meaning being especially beneficial. A third contribution is its role in improving comprehension. Because, as described in section III, studies show that adjustments that occur when meaning is negotiated improve input comprehensibility, and because comprehensible input is necessary, although insufficient, for acquisition, there is clear evidence of an indirect causal relationship between conversation and acquisition, as proposed by Long (1983b).

A possible fourth role is a direct one between interactional modifications and acquisition, but evidence for this is still scarce. Acquisition takes time, and it is difficult to control for outside exposure during an experimental study that lasts

long enough. There have been some efforts at short-term cross-sectional studies, however. Using a pretest–posttest control group design, Loschky (1989, 1994) randomly assigned 41 English-speaking college students learning Japanese to three groups, one of which received unmodified input, one premodified input, and one negotiated input, in the form of spoken descriptions of pictured objects that the listeners had to identify by circling or numbering. The input contained examples of two target Japanese locative structures and new vocabulary items. An immediate posttest consisting of two vocabulary recognition tests and a sentence-verification task showed significantly greater comprehension for the negotiated input, but not the premodified input, group over the control group in both lexis and morpho-syntax. Aural recognition and sentence-verification tasks a day later failed to find any greater retention of the target structures or vocabulary by those learners, however, although there were significant pretest–posttest gains across all three groups, perhaps due to the task focus on form–meaning relationships.

In a study of the effects of input modification and opportunity to negotiate for meaning on both comprehensibility and IL change, Gass and Varonis (1994) compared the performance of 16 adult NS–NNS dyads under various conditions on two closed, two-way, object-location tasks. The researchers looked at (1) the immediate comprehensibility for NNSs of prescripted modified and unmodified NS input, with or without the opportunity for NS–NNS negotiation of that input, and (b) the effect of having heard modified or unmodified input on task 1, with or without the opportunity to negotiate, on the accuracy of NNS descriptions on task 2, as measured by NS comprehension of those descriptions. As reflected in their ability to locate unseen objects accurately, on task 1 NNSs understood modified input statistically significantly better than unmodified input, and (consistent with Pica, Doughty, & Young, 1986, and Loschky, 1989, 1994) negotiated input statistically significantly better than unnegotiated (modified or unmodified) input. On task 2, half the NS listeners were allowed to interact with their NNS partners, and half were not. This was not found to affect their success in placing the 20 objects accurately. Of most interest, it was found that on task 2 those NNSs who had been allowed to interact with their NS partners during task 1 were now statistically significantly more accurate in their descriptions than those who had not been allowed to interact on task 1, as measured by the NSs' success in placing the 20 objects on the new board scene.

A qualitative analysis of the transcripts revealed that the advantage for NNSs able to negotiate on task 1 lay not in their ability to clarify unknown vocabulary items and learn them, but in the opportunity the negotiation provided for them to acquire various descriptive devices the NSs used to explain the items, such as *eat(s) nuts* to indicate a squirrel. NNSs who had heard unmodified input on task 1 also picked up descriptive devices used by the NSs, but tended to use them inappropriately on task 2, as if they had acquired the form but not the function. Thus, Gass and Varonis pointed out, although there were immediate effects on compre-

hension on task 1 for both input modification and interaction, on task 2 there was an effect for *preceding* interaction (task 1), but neither current interaction (task 2) nor input modification. Gass and Varonis argued that the advantage of the negotiation work is that it focuses learners' attention on linguistic form, in this case, on ways of describing objects. This allows them to notice mismatches between their output and NS input, especially when communication breakdowns are repaired. This, in turn, can trigger IL restructuring, the effects of which may be visible immediately or later.

A fifth, indirect contribution of conversation is that the need to communicate may raise learners' awareness of language, as R. Ellis (1992) suggests, with a resulting increase in attention to form and a heightened proclivity to notice mismatches between input and output. In this regard, it is noteworthy that two studies of the relative utility of models and recasts have favored recasts in L1 (Baker & Nelson, 1984) and in L2 (Mito, 1993) acquisition. A possible interpretation of these results is that some items that researchers consider unprocessable, and so unlearnable, at a given stage of development may actually be processable but not normally noticed. Both Baker and Nelson and Mito found at least some child or adult learners acquiring one construction through recasts that comparable learners did not acquire from models, while failing to acquire a second matched structure from models which the second group did acquire from recasts.

Finally, although often analyzed separately and shown to occur independently in FTD (Long, 1980, 1983b), there is also an important connection between modifications to input and to the interactional structure of conversation. Braidi (1992) points out that the comprehensibility brought about by interactional modifications allows the input itself to remain relatively more complex—ultimately not modified at all—thereby allowing learners access to new target forms, and eventually to the full target code. Linguistic modifications that simplify the input, conversely, achieve comprehensibility partly by removing unknown forms, thereby improving comprehension at the expense of acquisition potential. Linguistic modifications can simultaneously dilute the semantic content, too (Long & Ross, 1993), which would suggest that interactional modifications are additionally valuable for the semantic richness they preserve. The semantic transparency achieved by interactional modifications as speakers negotiate for meaning is important, therefore, not just because it makes input comprehensible, but because it makes *complex* input comprehensible. Both comprehensibility and complexity are necessary for acquisition.

B. The Interaction Hypothesis

Based on the arguments and literature reviewed above, I would like to suggest that *negotiation for meaning,* and especially negotiation work that triggers *interactional* adjustments by the NS or more competent interlocutor, facilitates acqui-

sition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways.

Negotiation for meaning by definition involves denser than usual frequencies of semantically contingent speech of various kinds (i.e., utterances by a competent speaker, such as repetitions, extensions, reformulations, rephrasings, expansions and recasts), which immediately follow learner utterances and maintain reference to their meaning (for review, see Snow, 1988). Such semantically related talk is important for acquisition for a number of reasons. The frequencies of target forms in the reformulations tends to be higher, as negotiation involves recycling related items while a problem is resolved, which should increase their saliency and the likelihood of their being noticed by the learner. Many of the input modifications described in section II, such as stress of key words, partial repetition, lexical switches and decomposition, involved in some reformulations can also serve to make target forms salient independent of increased frequency in the input, for example, by moving them to initial or final position in an utterance and through the addition of stress and pauses before and after key forms, once more increasing the likelihood of their being noticed. The reformulations also often involve rearrangements of adjacent utterances that both reveal how their constituents should be segmented, and weave rich semantic nets that illustrate the communicative value of TL forms (Widdowson, 1978, pp. 10–12) in ways that isolated linguistic models can do less well if at all. In general, the increased comprehensibility that negotiation brings helps reveal the meaning of new forms and so makes the forms themselves acquirable. Any tentative adjustments to the IL grammar can be tested very quickly if they are reflected in the learner's modified output and in turn elicit feedback.

The reformulations occur when the child or adult L1 or L2 learner is more likely to be alert, in Tomlin and Villa's (1993) analysis of attention, because he or she is already participating in the talk, has just spoken, has said something with enough propositional content for the caretaker or NS to say something relevant in reply, knows what he or she intended to say, and is interested in seeing the effect his or her utterance produces in the interlocutor. (Many other conversational moves lack some or all of these qualities.) At that moment, when the intended message is clear to the learner and his or her attention is focused on the other speaker, the fact that the semantic content is already at least partially clear also means that more processing resources can be oriented, if necessary, to the form of what the interlocutor says next. In the majority of cases, where only slight meaning changes are required in the reformulation, most of the learner's attention is free to work on those changes, and at least some of them and the new input they involve are more likely to be within the processable range for the learner and so detectable. Greater linguistic complexity may be manageable because it is compensated for by interactional modifications and the greater than usual semantic transparency in such negotiation work. Although there is no guarantee that the

spare attentional resources will be allocated to form, of course, the chances that the learner will detect the changes, understand them, and incorporate them is likely to be higher than when both form and meaning are opaque.

These qualities of negotiation work, in other words, may function to focus the learner on form in a similar way that input enhancement appears to do in the classroom and laboratory studies discussed briefly in section IV. Heightened attention makes detection both of new forms and of mismatches between input and output more likely, and such mismatches may also provide at least some of the information a learner needs about what is *not* permissible in a language. More such incorporations and changes can be predicted, therefore, in learners who receive higher quantities of semantically contingent speech through negotiation for meaning.

As should be obvious, the above updated version of the Interaction Hypothesis (Long, 1981a, 1983c) involves a mix of well and less well-established L1 and L2 acquisition research findings, some rather high inference interpretation, and some speculation. It is certainly not intended, of course, as anything like a complete theory of language learning. Many aspects of the proposal have barely begun to be investigated in adult L2 acquisition and pose potential problems. For instance, does negotiated input really preserve needed structural data, and if so, do learners notice them more readily than in other input? Does the negative input provided in negotiation work contain sufficient information on what is ungrammatical in an L2, as well as what is possible? Can learners hold their own and others' utterances in memory long enough to perform the cognitive comparison of an original and reformulated version of an input string, or of input and output, required if the linguistic reformulations often present in semantically contingent speech, such as recasts, are to serve the purpose claimed for them? Does semantically contingent speech facilitate adult L2 acquisition as it appears to do for child L1 acquisition? Do adults perceive negative input for what it is and respond differentially to recasts and other reacting moves in the way children have been found to, or do alternate sociolinguistic norms operate to prevent this? What L2 abilities can be derived from "static" written input and the relatively "nonnegotiable" conversation of some classroom language lessons—the only learning opportunities available to many learners? Are attentional resources freed up by semantic transparency oriented to form in the input? Are observed short-term benefits of negotiated interaction, such as incorporations of corrective feedback, indicative of genuine long-term IL development? L2 acquisition research on the environment has come a long way, but a great deal of systematic work clearly remains.

In a salutory warning to students of the linguistic environment for language learning, Durkin (1987) noted the dangers inherent in seeking, and especially in finding, real or potential environmental contributions. There is a tendency in such work, Durkin points out, to focus on the associations between grammatical input and development and to ignore or downplay the numerous environmental features

that apparently make no difference whatsoever. There is also a tendency to forget the resilience of human language learning capacities in the face of quite extreme environmental impoverishment. As Shatz (1982) pointed out, care must certainly be exercised not to attribute exclusive causative status to qualities of input to the learner or to qualities of the learner's conversational experience. The learner's current knowledge of the L2 and built-in acquisition processes clearly exert a major influence on learning. The search is for those features of input and the linguistic environment that best interact with learner-internal factors to facilitate subsequent language development. Moreover, although some experimental results suggest that recasts can be sufficient to induce acquisition of new structures, there is no evidence that they are necessary for acquisition. In fact, if production is not necessary, recasts logically cannot be.

It may be that many children or adult L2 acquirers never receive recasts of various structures, for example, yet acquire them, or rarely receive the kind of interactional experience that recasts occur in at all, yet again acquire language in other ways. What is of interest to L2 acquisition theorists and L2 educators alike, however, is the preliminary evidence of a facilitating effect on comprehension and acquisition of semantically contingent speech and negotiation for meaning. For theorists, it suggests some of the variables—semantic transparency, feedback, and attention, for example—that play a central role in learning. For educators, with the caveat that we are dealing with a claim, not established wisdom, it suggests the importance of classroom activities that engage those attributes. In this last regard, tasks that stimulate negotiation for meaning may turn out to be one among several useful language-learning activities in or out of classrooms, for they may be one of the easiest ways to facilitate a learner's focus on form without losing sight of a lesson's (or conversation's) predominant focus on meaning. In so many learning situations, including task-based, content-based, bilingual, and immersion programs, it is this twin focus on language learning and learning through language that is sought by learners and society alike.

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