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Technical Report No. 214

LEARNING THE RULES OF THE GAME:
FOUR VIEWS OF THE RELATION BETWEEN
SOCIAL INTERACTION AND SYNTAX ACQUISITION

Marilyn Shatz
University of Michigan

September 1981

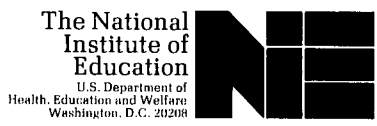
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Learning the Rules of the Game: Four Views of the
Relation Between Social Interaction and Syntax Acquisition

That language is a phenomenon belonging primarily to the domain of social activities is hardly an arguable point. While one can list nonsocial uses of language as well as types of social interaction that are not linguistic, the fact remains that the overlap between language use and social interaction, though imperfect, is still considerable. Moreover, some minimal amount of social interaction seems to be necessary for language acquisition to take place. The obvious kinship between language and social interaction suggests the possibility of a relationship between knowledge in the social sphere and the learning of linguistic forms. Yet, the precise nature of that relationship is not so obvious. While researchers have often argued that investigations of the social contexts of acquisition are central to demystifying the process of acquisition (e.g., Campbell & Wales, 1970; Ryan, 1974), few have specified just what the role of interaction in acquisition might be. Despite this lack of clarity, the popularity of the primacy-of-interaction view, as well as the number of studies it has already spawned, is astonishing. For this reason alone, it is worth examining more carefully some possible relationships between social interaction and syntax acquisition, with particular attention to their historical origins and the arguments that can be mounted for or against them.

Given the vagueness with which the interaction-language relationship is often treated in the literature, how can one begin to explicate and evaluate different possible views of that relation? I suggest that one can ask four questions which help to differentiate positions and to provide a system for organizing data potentially relevant to evaluating them. First, one can ask whether the acquisition of social knowledge and linguistic knowledge are seen as simultaneous tasks or whether one is considered to be prior to the other. Second, are there facilitating effects of one system on the other and are they unidirectional or bidirectional? A third question concerns the directness of the relationship. That is, how much is the relation mediated by the internal properties of the child? Finally, one can ask whether the relationship is based on structural commonalities between the two systems, and if so, what the nature and extent of those commonalities are. While the existing data do not allow us to determine with much certainty or specificity the actual relationship between social interaction and syntax acquisition, I contend that we can at least limit the set of relationships which it is reasonable to investigate further to those consistent with tentative answers to these four questions.

As a way of examining the data bearing on the answers to these questions, I outline and evaluate four different kinds of relationships between social interaction and syntax acquisition which are

distinguishable on the basis of the different sorts of answers they provide to the above questions. The positions range from a strong one, deriving syntax acquisition directly from interactionally provided social knowledge (View 1), to a weak one, where the relatively autonomous process of syntax acquisition can be facilitated by the efficient distribution of processing resources (View 4). From the discussion of the four positions, I shall conclude that the set of reasonable relationships adheres to the following constraints: First, while some social knowledge is acquired earlier than linguistic knowledge, it is unlikely that much of the acquisition of one system occurs prior to the other. Given this, it is likely that facilitation will be bidirectional, if it occurs at all. With regard to the specific sort of relations to be found between the two domains, there is at best only a partial structural commonality, and even this is relatively indirect, suggesting that internal properties of the child are central to a characterization of the relation.

One implication of these conclusions is that interactionist, anti-nativist theories of acquisition are incompatible with reasonable relationships between social interaction and syntax acquisition, since they discount the importance of the internal properties of the child. To anti-nativists, who are so often strong advocates of the investigation of the social interaction context of language acquisition, this implication is likely to be both surprising and disconcerting.

Perhaps they can take solace in yet another conclusion: that there still appear to be places for social interaction in the acquisition story, albeit not the expected one. To defend these claims, I turn now to the outlines of the four positions.

An Anti-Nativist View: Direct Structural Relations

There can be little doubt that the recent interest in the relationship between social interaction and the acquisition of language is in direct response to the innateness solution proposed by transformational grammarians to the puzzling fact that language development occurs during a time when other complex cognitive systems do not demonstrate such quick and general growth. As Bruner (1977) noted,

"The dominant view of the last decade has been, of course, Chomsky's, based on his so-called Language Acquisition Device. But the central feature of that device--that the child in some sense 'has a knowledge' from the start of the universal rules of language and that he generates from this knowledge hypotheses about the local language encountered around him--while boldly suggestive, is plainly insufficient in the light of the past years of research. A more realistic approach to language acquisition must surely examine what the child learns that helps him pass from prespeech communication to the use of language proper, lest we leap too easily to Cartesian conclusions about innateness."

A proposed alternative to the innateness solution, then, is to give the child a prior-learned system of knowledge with which the child

can uncover the structure of language. Since language acquisition goes on in a social context, a good bet for the known system is interactional knowledge.

Note that if the motivation for a system of antecedents is to reduce the contribution of the child, then only certain kinds of prior systems will suffice; namely, those which directly and clearly provide the structural information necessary for the acquisition of the new system, since any indirect relation assumes mediation via the internal properties of the child. (We discuss below other sorts of prior systems not so motivated and without the anti-nativist constraint that the child be a weak contributor.) More specifically, the notion of facilitation on structural grounds seems to depend on a view of the child as analogy-maker, seeing similarities between one system and another (cf. Shatz, in press). As Gentner (1981) has pointed out, analogy differs from identity in that making analogies always involves selecting some relations and not others as relevant. The ability to be appropriately selective is, of course, a property of mind and would appear to go against the goal of weakening the child's contribution. Yet, to the extent that the analogy between the known and unknown system is a good one, then presumably it requires less on the part of the learner to recognize and understand it. Thus, the issue is whether there exists a "good" analogy between the two systems. Good structural analogies have been described as

clear, systematic, and specific (Gentner, 1981). To date, the evidence that the relationship between social and syntactic information has these characteristics has not been forthcoming. Few specific relations have even been proposed and those that have (e.g., Bruner, 1975) have not been successfully defended. For example, while interactions involving actions such as giving and taking may have an inherent order to them, the translation of that order to word order in a given language is not necessarily direct or transparent (cf. Slobin, 1982). Likewise, gestures, another source of information in interactive situations that has been proposed as potentially useful to the child (Macnamara, 1977), do not map to grammatical properties of language in sufficiently unique or systematic ways to be taken as good clues to structure (Shatz, in press).

Even if "good" analogic relations could be found, there is a further requirement that would have to be met before acquisition could be claimed to be free of much mediation by the internal properties of the child. Since language acquisition is not instantaneous, the order and rate of development should also be a function of the social environment. There are two alternative ways this requirement could be fulfilled. First, the child might be provided during the prelinguistic stage with all the social information he or she would need to acquire language, but only gradually be provided with the necessary interaction-language pairs from which

to draw the appropriate structural analogies. The other alternative is that as soon as the child obtained a particular social understanding, the relevant language would immediately be provided and the structural information extracted. In either case, the order of acquisition would depend on the orderly provision of data from sources outside the child.

Consider instead a state of affairs such that, regardless of what mappings were provided for him, the child acquired grammar in a different way from the way the data were presented. Then one would have to concede that there were internal constraints on the application of the prior system to the one being acquired. Such constraints might be either general processing characteristics that limit the young child's ability to use the data as given or constraints peculiar to a language acquisition device. Presumably, the former limitation would be more palatable to anti-nativists than the latter. However, in the absence of a well-documented theory of processing, it is impossible to determine which of the internal constraints that might be found stem from general processing causes. Hence, any evidence for internal constraints is a potential threat to an anti-nativist position.

Again, the relevant data are not encouraging to the anti-nativist view. Elsewhere I have addressed at length the problems of trying to locate the major burden of acquisition order in the environment (Shatz, in press). Suffice it to summarize those arguments here

by saying that the facts of early mother-child interaction do not support the view that mothers are so finely tuned to their children's development that they provide them with an ordered set of regularly changing data that can account for the order of their acquisitions (also see Hoff-Ginsberg & Shatz, Note 1, for a review). Rather, it appears that children take from the data the information they are "ready" to utilize. Readiness appears not to be a function solely of what the child has already been exposed to but of what the child has already constructed of the grammar. Whether the child's selectivity is a result of processing limitations or the language acquisition "program," to the extent that there appear to be internal influences on acquisition order, then there is less reason to hold to a strong anti-nativist position.

Still another characteristic of the anti-nativist view can be called into question. As noted above, social knowledge is assumed to be the base system generally necessary to the acquisition of syntactic knowledge, although specific alternative formulations may vary with regard to how much social knowledge precedes any syntax acquisition. That is, all relevant social knowledge could be acquired prior to any syntactic acquisitions during the prelinguistic period, or "local" advances in social knowledge could be followed by relevant local acquisitions in syntax. In either case social knowledge necessarily precedes advances in syntax, and the acquisition of it is conceptualized as a prior and not a concurrent task.

However, children's interactive behavior can often be shown to be the result of fairly primitive response strategies, and the development of their intentional understandings may depend at least in part on linguistic cues (Shatz, 1978c). Moreover, the strategies children sometimes develop in interactive situations often seem to be far removed from either interactive or formal linguistic convention. For example, we observed the following dialogues between a 25-month-old child and her mother, who regularly used 'hmm' in two ways, either to acknowledge her child's utterance or to prompt the child after an unanswered question of her own.

1. M: Can you put the bed in one of the rooms?

Hmm?

C: Hmm.

2. M: Who's gonna drive the car?

C: Hmm.

M: Who's gonna drive the car?

C: Hmm.

M: Is Mommy gonna drive the car?

C: Hmm.

3. M: What's this?

C: Doggie.

M: How does a doggie go?

C: Woof.

M: Woof?

Hmm. Okay.

Where should the doggie go in the house?

C: Hmm.

The sequence suggest the child developed an answering strategy on the basis of her experience with her mother, but her response behavior indicates that she misinterpreted and misused the interactional data provided. Such examples have to make one skeptical about how much a child knows about the meaning of the interaction she is being engaged in before she begins to unravel the complexities of syntax.

In sum, then, the interactionist, anti-nativist view answers the four questions we posed earlier in the following way: There are direct structural commonalities between the two areas of knowledge, the contribution of the child is low, and the social task precedes the one of syntax acquisition, with the direction of influence flowing from the prior to the later task. On multiple grounds, such a view does not seem tenable. It remains to examine other sorts of language-interaction relationships and the cases that can be made for them.

Neo-Nativist Views: Partial or Indirect Structural Relations

In and of itself a system of necessary antecedents is not incompatible with an innatist view of language acquisition. Indeed, recent theories of syntax acquisition which postulate rich innate

linguistic mechanisms also stipulate the need for meaning representations of input sentences in order for syntactic analysis to proceed (Pinker, in press; Wexler & Culicover, 1980). To the extent that such representations are derived from events occurring in a social context, social information becomes prerequisite to the syntax acquisition enterprise. While one sort of knowledge still takes temporal precedence over another, these systems differ from the anti-nativist view on several grounds. Most importantly, the relation between prior knowledge is presumed at best to be either indirect (Wexler & Culicover, 1980) or partial (Pinker, in press). Indirect or partial mappings suffice because these views postulate, in addition, the kind of innate apparatus rich enough to operate on such inputs to create the necessary linguistic structures. Hence, for Wexler and Culicover, prior semantic representations generate (by an unspecified process) deep structural representations which are then the base with which surface strings are associated such that SS-DS strings can be analyzed in accordance with universal grammar principles to accomplish the construction of a particular grammar.

An alternative role for semantic information is suggested by Pinker (in press). In his theory, semantic correlates to syntactic constructions are necessary initially to begin the learner's task of fixing parameters for innate syntactic schemata. Once some parameters are set, however, the syntactic system can bootstrap

itself, with syntactic information even fed back into the further development of the semantic system. The relationship of semantics to surface syntax may be more direct in Pinker's theory than in Wexler and Culicover's, yet Pinker's approach differs from the anti-nativist views discussed above in that, like Wexler and Culicover, he maintains that syntactic entities are givens to be interpreted in light of, rather than derived from, prior information. Hence, both Pinker's and Wexler and Culicover's positions are to be distinguished from the first view on two grounds: They grant the child more innate linguistic apparatus, and whatever link there is to social interaction is maintained via semantic representations.¹

To the extent that these nativist views assume an understanding of what is said solely on the basis of contextual information, they are subject to some of the same criticisms as the anti-nativist view; namely, that there is little evidence the child has much understanding on nonlinguistic grounds alone. The more these views reduce dependence on prior knowledge, the more they avoid this objection. Unfortunately, neither view is sufficiently well specified on these grounds for one to be able to evaluate them much further. Wexler and Culicover do not address the question of the origins of the semantic representations, nor do they consider the extent to which semantic representations must be present before syntactic analysis proceeds. It is unclear what the implications would be for their model if semantic readings

for only some subset of input sentences were available to the child, thus limiting the set of sentences on which syntactic analysis could initially be done. As noted above, such a limitation seems compatible with Pinker's approach, although the details remain to be worked out. Indeed, depending on the nature of bootstrapping and feedback operations, it is possible that the learning of language could itself facilitate an understanding of the social system in which linguistic experience itself is embedded. In other words, such a system would be bidirectionally facilitative.²

One virtue of these more recent nativist approaches is that they avoid a criticism of the earlier nativist view; namely, that it ignored the socio-cognitive context of acquisition. In so much as these approaches take that context into account while at the same time arguing against an isomorphism between prior forms of knowledge and syntactic knowledge, they seem more reasonable in general than either earlier nativist or current anti-nativist accounts. However, evaluating particular proposals for the relation between innate capacities and mechanisms for utilizing nonlinguistic information in the acquisition process must await better specification of these aspects of the theories.

The Process Approach: The Allocation of Resources

The two previous views assume that facilitation of syntax acquisition is accomplished via some structural analogues between a

system of antecedents and the system to be learned. They differ in the degree of relation between the two systems and the extent to which one derives from or is subsequent to the other. A third alternative is one that focuses less on structural relationships and more on how, despite the lack of clear structural mappings between the two systems being learned, progress in one might facilitate progress in the other. This alternative takes as a given that in any conversational situation young children have essentially two tasks, one to create a productive grammar on the basis of the language to which they are exposed, and the other to function as active participants in their social worlds. To the extent that the interactive task can be accomplished with relative ease, more resources can be allocated to the analytic task. Thus, the crucial difference between this view and the previous ones is that facilitation occurs via the easy resolution of one of two tasks rather than via structural analogies.

There are two ways in which solutions to interactive tasks can be found easily. One is actually to have the social knowledge on which to base interactive responses. Yet, as we have seen, attributing much social knowledge to such young children is troublesome. A second possibility is that children develop primitive heuristics for staying in interactions. That is, they have interactive strategies which result in relatively acceptable behavior before they fully understand what is being said to them or what is

expected of them. The proposal of heuristics has the advantage of avoiding the troublesome attribution of social knowledge to the child while still providing a means of making the interactional task "easy" from the perspective of the expenditure of resources. Thus, the process approach maintains the possibility of facilitation while depending neither on structural relationships nor on a high level of prior social knowledge.

Two kinds of facilitation are possible in this view. The most obvious sort is rather general. Just about any strategic behavior which fulfills the requirement that a response occur without much analysis of the conversational demands should result in resources remaining for other tasks. It is, of course, possible that some strategies are more efficient than others; that is, they use demonstrably fewer resources in their execution than others and hence are even more facilitative. Even so, they should simply result in more general facilitation on the rate of, as opposed to changes in, the mode of acquisition.

The second sort of facilitation is more direct and specific. While it is clear that children progress through the acquisition process at different rates, it is as yet unclear whether modes of acquisition differ in interesting ways among children or whether such differences are at all related to interactional behavior. One can

speculate, however, on how diverse interactional strategies might have more specific effects on syntax acquisition. First, it is possible that a given interactional strategy focuses attention on particular aspects of the speech stream, making it more available to analysis. For example, some children apparently imitate the most recent words they hear as a way of producing a response in an interaction. It may be that one consequence of the attention focused on the ends of utterances is that they gain preferred status for early syntactic analysis as well. Secondly, since strategic behavior is embedded in an interactive situation, one consequence of it is that it has a role in eliciting further input to the acquisition system. Insofar as different interactive strategies result in different subsequent turns by the conversational partner, then the child may be exposed to different but especially salient information, depending on his particular behavior. For example, consider the child discussed earlier who had learned to respond to his mother with "hmmmm." Such responses on his part were often followed by his mother reformulating her question to him or asking a second question. Contrast that sort of input with the behavior of a mother whose child often responded "that" to just about any sort of question she asked. Her response to those often inappropriate responses was to name an object she thought might be the referent for the child's utterance. Hence, these two children were getting differential amounts of different inputs as a

consequence of their response strategies. If the mechanisms of syntactic analysis are at all sensitive to frequencies of different types of input, then these sorts of differences could have an effect on the acquisition process.

The process approach has several advantages over the anti-nativist position in that it avoids two major difficulties of the latter view. One is the postulation of direct structural relationships between the social sphere and the syntactic one; the other is its dependence on external factors as the major determinant of the rate and course of acquisition. The process position avoids these problems first by taking no stand on the issue of structural relationships; they are not crucial to the proposed facilitation mechanism. On the other hand, insofar as some structural relations, either partial or indirect, may be necessary for syntactic analysis to proceed, the view is not incompatible with the nativist positions discussed earlier. Secondly, the mechanism of resource allocation maintains a role for the environment but gives the child a larger role in the determination of rate and order of acquisition. To the extent that resource allocations are functions of strategic behaviors developed in and having consequences for interactions, the determinants can be said to be truly interactive, rather than wholly external or internal to the child. Thus, this position avoids the criticism that can be made of the anti-nativist view that the environment has to operate in a manner finely

tuned to the child's capacities without a clear exposition of the means for achieving that tuning or empirical evidence for it (see Shatz, in press). Still another advantage to the process approach is that it allows for bidirectional facilitation. Presumably, syntactic analysis would result in a greater degree of linguistic performance in interactive situations, possibly fostering the engagement of the child in more sophisticated social interactions, with increased opportunities for social learning.

With regard to evidence for the process approach, much of it is on the level of feasibility arguments rather than actual demonstrations of facilitation. For example, the notion of limited resources has a reasonably long and respectable history in cognitive psychology. Moreover, it has on several occasions been recruited to explain children's linguistic and communicative behavior (Bloom, Rocissano, & Hood, 1976; Knapp, 1979; Shatz, 1978d). One possible difference between these previous uses of the notion and the one used here is that in the previous cases, while researchers argued that the performance of one task could interfere with the performance of another task, the two tasks drawing on the same pool of resources seemed alike in that they both involved the execution of cognitive processes, for example, understanding utterances, producing syntactically complete strings, and so on. In the present case, one could argue, the claim is somewhat different; namely, that it is a performance task and a

learning task which are hypothesized to share the same resource pool. Furthermore, it could be argued that there is less evidence in the cognitive literature for these sorts of tasks sharing limited resources than for ones in like domains doing so. The counter to this argument is that in the absence of full understandings of learning and cognitive processes, it is unclear how different or separate the two sorts of tasks are. At least at present, there seem to be neither theoretical nor empirical reasons to reject the proposed extension of the limited resources argument out of hand.

As for the existence of conversational strategies, the evidence in favor of them seems reasonably solid. Not only are there many anecdotal reports of the sort quoted in our examples above, but more systematic work has also confirmed the existence of various sorts of response heuristics in young children. Shatz (1978a; 1978c; Shatz, Bernstein, & Shulman, 1980) found that children had a tendency to produce action in response to ambiguous utterances. Allen and Shatz (Note 4) described children who took any sort of what-question as an opportunity to make responses based on their experience with their own mother's question routines, and imitation as a conversational response strategy has been suggested by Rees (1975) and reported by Boskey and Nelson (Note 5). Such research suggests that children develop consistent ways of responding to conversational demands on the basis of only partially understood or analyzed information about

either the linguistic or communicative constraints on the messages addressed to them.

To my knowledge, there have been no direct tests of a process facilitation model. However, a bit of suggestive data is available from a study done on the relationship of children's behavior in response to language under different conditions of contextual support (Shatz, Allen, & Raizman, Note 6). In this study children aged 18 to 26 months were asked a variety of questions like "What says woof-woof?" and "What does a dog say?" The same questions were asked three times, once with a gesture at a relevant object (in this case, a toy dog), once with a gesture at an irrelevant object, and once with no gesture at all. We found that the 14 subjects could be divided into three groups: five who had more tendency to produce verbal imitations as responses, five who had virtually no tendency to do so, and four who occasionally imitated. In other words, we seemed to have children with different sets of strategies for operating in unfamiliar conversational settings. The question of relevance here is whether these children differed in their linguistic knowledge in ways that suggested their different strategies of interaction might have led them down divergent paths of linguistic development.

Before proceeding, it is important to point out that the groups were unequal in that by and large the imitators tended to be found among the younger children. Hence, overall differences in general

measures of language development such as mean length of utterance (MLU) were expected, although the correlation between MLU and frequency of imitation was low once age was partialled out ($r = -.19$). Of more interest is the possibility that the less generally advanced group had some knowledge not possessed by the more advanced group. In particular, imitators may have been more sensitive to words likely to appear at the ends of utterances and therefore might have learned more about constructions appearing in last position than would non-imitators. One of our question types was the sort of construction requiring a progressive verb, e.g., "jumping," in response to questions like "What is the girl doing?" Thus, we could examine whether imitators were better at this sort of response form than nonimitators. In fact, only one imitator produced any syntactically canonical responses to such utterances, as did one nonimitator. Nor was imitators' performance on this utterance type any better than on the other sorts of utterances where facilitation via an imitation strategy might not have been expected.

Given the age differences in the subject groups, one might argue that imitation is a characteristic strategy of an early stage through which our nonimitators had already progressed. If so, they would have already achieved benefits from it and could not be expected to look worse on this measure than children still in that stage and in the process of acquiring those benefits. There are two reasons

to discount this argument. First, there is little reason to believe that all or even most children go through a stage of imitation (Bloom, Hood, & Lightbown, 1974). Second, most of the nonimitators failed to produce canonical responses; hence, if they did pass through a stage of imitation, they apparently learned little about progressive verbs while in it. In sum, neither nonimitators nor imitators do well on a construction that might reasonably be expected to be facilitated by an imitation strategy.

Obviously, the data presented above are only suggestive. They neither address the issue of general facilitation nor do they unequivocally disconfirm the possibility of specific influence. They do suggest, however, that conversational strategies may have little effect on the progress of syntax acquisition, and that the two tasks being accomplished by the child may go on relatively independently of one another.

It is important to point out that even if specific process facilitation was proved, it would have few implications for the etiology of linguistic structures. Because no assumptions of structural analogies are made in the process approach, the architecture of the syntactic system is assumed to be derived from other sources, either innately linguistic or possibly cognitive in nature. Facilitation, should it occur, is primarily of rate, and of order for those places in the

system where the order in which parameters are set has no consequences for the structure of the system. Thus, the process facilitation view does little in and of itself to assuage anti-nativist qualms concerning innate constraints on linguistic structure. As already noted, the process view is compatible with nativist proposals. It is also compatible with the final view to be presented, one in which the possibility of structural relationships exists, not because of one system depending on or deriving from the other, but because the acquisition of the complex systems of both social and syntactic knowledge are subject to the same constraints inherent in the learning device.

A Relationship without Facilitation: Commonality of Learning Principles

The previous views have all in one way or another assumed some sort of facilitation, either unidirectional or bidirectional, as a function of the relationship between social and syntactic systems. Yet, the possibility of a relationship between the two systems does not depend on the occurrence of facilitation. It may be that the systems share properties in common such that the investigation of one can lead to insights into the acquisition of the other without the actual acquisition of one leading to facilitation of acquisition of the other. In other words, the analogy between the systems may be more appropriately applied at the level of the researcher's analysis

than at the level of the child's. The proposal to be considered here is that the shared properties have to do with the common principles operating in the acquisition of complex knowledge systems.

There are several reasons for suggesting that there may be common properties to the acquisition of both social and syntactic knowledge. First, while structural relations between the systems have been difficult to confirm, there is little doubt that both are complex, rule-governed systems. Both, for example, are characterized by multiple form-function mappings. In language, one syntactic structure can serve more than one function, and multiple forms can express a single function. Similarly, a sequence of interactive behavior can serve multiple social purposes, and particular purposes can be expressed in multiple ways. Secondly, both systems seem to have some universal properties as well as others that are culture or language specific.

As for developmental considerations, rapid progress on both tasks is made early in life, when general cognitive limitations of the child are presumably at their greatest. Finally, in both the social and the linguistic spheres, it appears that the systems to which children are exposed are somewhat modified and adjusted to the child's capacities (Ratner & Bruner, 1978; Snow, 1977; Snow, Dubber, & deBlaw, Note 7). In the case of syntax, the modifications do not appear to solve all the problems of acquisition (Newport, 1976; Shatz, 1979). While it is less clear to what extent the early interactions in which parents engage their children ease the problem of

learning the social rules of the culture, our "hmm" example at least suggests that early interactions are not always transparent. Furthermore, the large within-culture and cross-cultural variations in the degree to which parents provide direct tuition in social behavior also suggest that the acquisition of social knowledge is not fully under environmental control.³ In sum, to the extent that children are confronted at the same point in time in their general development with sets of complex data that are nonobvious with regard to the organization of the systems, then one might expect that children bring to the acquisition of such systems a common set of devices for dealing with the input data. While the discovery of such common acquisition principles, if they exist, is sure to be an arduous task, I suggest below a few examples of the kinds of commonalities I am proposing.

At a fairly elementary level, one can draw parallels between the acquisition stages of the two systems with regard to the occurrence and role of rote learning. In both the social and linguistic domains, children are engaged early on in rather rigid sequences of routinized behavior. There are several reasons why routines might be crucial to the acquisition of complex systems composed of multiconstituent sequential behavior. For one, the routines may have consequences for the ease of processing in that their practice may enhance the accessibility of responses in sequence. Moreover, without requiring

much creativity or knowledge on the part of the child, they foster participation in extended patterned sequences, providing information on the pacing and time parameters for standard sequences.

It has been argued that even some of the structural aspects of the systems to be learned can be demonstrated in a series of routine sequences by varying the units which share privileges of occurrence within sequences, by transforming elements systematically, or by varying the occurrence of optional elements (Bruner & Sherwood, 1976; Ratner & Bruner, 1978). However, the learner must be able to take advantage of such information displays. Insofar as any learning in either the social or the syntactic spheres takes place on the basis of such demonstrations, it is likely that both systems recruit common cognitive procedures for characterizing the displayed information on the basis of optionality, privileges of occurrence, permissible transformations, and so on. Moreover, it seems reasonable that the necessary cross-sequence comparisons in both systems would be subject to the same memory limitations.

It is important to note that this view differs from the anti-nativist one in that no direct structural analogies between the two systems are being suggested. Rather, the two systems are both constrained by their dependence on a set of common cognitive procedures. There is no stipulation that all available procedures be utilized for the acquisition of every complex system, nor is it necessary that there be a unique procedure for any analysis that must be done.

Therefore, a partially unique solution to its overall acquisition problem may be achieved within each knowledge domain. One would not predict isomorphic relations between any two complex systems any more than one would expect isomorphic specific grammars in two languages commonly constrained by principles of universal grammar. As in languages, the only place where isomorphic properties would be expected is where there would be a unique solution to a commonly required analysis. It would be foolhardy to speculate at this time on the location of such intersections of the two complex systems being considered here.

Moreover, it is reasonable to suggest there may be uniquely linguistic procedures among the set of procedures, if all that is meant by the suggestion is that there exists at least one procedure which applies only to linguistic data. Such procedures may exist either because humans do not fully utilize their capacities to create a complete range of possible complex systems or because those procedures are appropriate only to structures functioning within one particular system and no other. This latter possibility is at the heart of traditional nativist claims, but the question of which procedures are shared by systems should be as interesting as whether there are ones unique to language. It is the investigation of the former question that might facilitate the understanding of the acquisition of complex systems generally.

The argument that children have procedures for analyzing complex data in order to construct a solution for an internal problem space has been elegantly presented for the language domain by Karmiloff-Smith (in press). She suggests that much of what passes as error in children's speech can be understood as indications of the internal analyses children perform. She takes as evidence for her position several cases in which children move from producing forms correct by adult standards to some consistent alterations of these forms and then back to more standard ones. A related example of analytic behavior is reported by Newport (1981). She notes that deaf children learning to sign go through stages of marking the decomposition of signs into their morphemic elements. Thus, instead of producing the sign for "cut with a scissors," which is made by projecting the hand through space while simultaneously moving the index and middle fingers in a scissoring motion, the children first make the scissoring motion and then move the hand through space. My suggestion here is that any complex rule-governed system will require an internal problem space for the accomplishment of acquisition, and that certain stages in the development of complex systems will resemble each other insofar as the analytic procedures utilized in those problem spaces are common ones. Thus, it would not be surprising to find evidence in the development of children's social knowledge of a stage at which they do the equivalent of morphemic

analysis. Indeed, the anecdotal reports of reduplicative phrases like "boy brother" or "mommy lady" may be attempts to mark separately each of the relevant dimensions along which distinctions in the child's social world are drawn.

In summary, then, the commonality-of-learning-principles view provides the following answers to the questions posed above. The tasks of acquiring social and syntactic knowledge are seen as being mainly simultaneous, primarily because the facts suggest that much of both are learned over the same time period in development. There is no necessary temporal relationship between them. Nor is there reason to suppose that the acquisition of one facilitates the acquisition of the other. Obviously, learning how to use one's language appropriately in social situations may be closely tied to social knowledge, but it is the acquisition of syntax in particular that is our concern here, and not pragmatic development. Third, the basic proposals of this position grant the child procedures for analyzing data in internal problem spaces. Hence, the role of the child as a mediator between the environment and the knowledge system is an important one. Finally, the existence of direct structural commonalities are compatible with but not necessary to the view. While the rules of the games may be different, the rules for learning the rules may not be.

Summary

Table 1 presents a synopsis of the kinds of answers the four positions described above give to the questions posed earlier. I have argued that the weight of the evidence is against an anti-nativist position, which depends on direct structural commonalities and prior social sophistication to support its claim that the child's contribution is low. By acknowledging a larger contribution from the child, the other views are more compatible with the current evidence on these issues. However, the views differ as to the specific nature of the child's contribution. The neo-nativist position argues for uniquely linguistic mechanisms to account for syntax acquisition. The learning principles view leaves open the question of how many procedures involved in syntax acquisition are uniquely linguistic, while the process view is compatible with both the neo-nativist and learning principles positions. In the absence of better-specified positions and with little relevant data, it is inappropriate to speculate on the relative worth of the neo-nativist and learning principles views. Indeed, it is possible that they may turn out to be closer to one another in their more elaborated versions.

It is perhaps reasonable to defend the exposition of these various positions despite their deficiencies in specificity and, undoubtedly, veridicality. The fact that interaction as a level of analysis is gaining equal status with the sentence and the word

Table 1

Four Views of the Relation Between Social Interaction and Syntax Acquisition

Characteristics	Positions			
	Anti-nativist	Neo-nativist	Process Facilitation	Learning Principles
Concurrent tasks?	No	No	Yes	*
Facilitation?	Yes, Unidirectional	Yes, Bidirectional	Yes, Bidirectional	*
Child's Contribution?	Low	High	High	High
Structural Commonalities?	Yes, Direct	Yes, Partial or Indirect	*	Only if based on learning principles

*For these questions, no one answer is central to the position. For example, structural commonalities are compatible with but not necessary to the process facilitation approach.

is indicative of the time and effort being expended on research on interaction and language. Some of that work is motivated by other interests than a desire to explain the acquisition of syntax. But often motivations are so unclear or the relation of such work to syntax acquisition is left so amorphous that erroneous conclusions are easily drawn. I have argued that "if the field of language acquisition is to go beyond the level of phenomenal description of behavior, the theoretical question of relations among kinds of knowledge must be addressed more explicitly" (Shatz, 1978b). The above is an attempt to provide a framework in which such a discussion can proceed.

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Footnotes

¹Pinker's and Wexler and Culicover's views are distinct from those (e.g., Schlesinger, 1971) that suggest syntactic structures evolve from semantic structures without benefit of further innate constraints. Since, for these latter views, too, semantic representations may depend to some extent on interactional experience, they appear to be related but non-nativist characterizations of a social interaction-syntax relation. However, such views are not presented here because they suffer other difficulties as viable theories of acquisition (see Marantz, Note 2, for a review).

²The position that language is a vehicle for providing the child with a social world view is a popular one in anthropological circles (cf. Schieffelin, 1979; Harré, Note 3). Such a position helps remind us that it was possibly the enticingly controversial nature of nativist claims, as well as a kind of ethnocentricity, which led developmental psycholinguists to consider social knowledge the antecedent and language acquisition the mystery to be explained in terms of it, rather than the other way around.

³See Schieffelin (1979) and Joslin (1958) for examples of direct tuition in different cultures.

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