

The Analysis of Intonation in Young Children

David Crystal

INTONATION IN ADULTS

It may seem paradoxical to begin an account of the development of intonation in children by discussing the findings of adult studies of the subject. Unlike most other areas of linguistic inquiry, however, the theoretical, methodological, and empirical issues surrounding intonational study are too ill-defined to permit the investigator to take much as axiomatic. Even in relation to the adult, the topic has received far less general linguistic investigation than any other, for reasons that are now well recognized (primarily, the lack of discreteness in the phonetic and semantic data of nonsegmental phonology; see Bolinger, 1949; Crystal, 1969). To the child language scholar, of course, this neglect might well seem to be a blessing in disguise. At least this way, it might be argued, one will avoid falling into the various traps that have ensnared workers in syntax and semantics, such as the assignment of conversational abilities and cognitive/semantic relations to the young child, that more reflect the analyst's or parent's belief patterns than any demonstrable linguistic behavior on the child's part (see, for example, the critique in Howe, 1976). To argue thus is not to deny the potential value of working with adult models as heuristic devices, but it is to affirm the dangers of uncritically imposing such models on the young child, or of setting up hypotheses about language ability that are in principle incapable of falsification (as in much of the discussion so far about speech acts in the first year of life). To begin empirically, then, by examining early child data, using as a framework of reference only the most general considerations of phonetic and phonological theory, and by attempting to see the intonational system of the child in its own terms, would seem to constitute a promising and well-grounded (albeit vast) enterprise.

Unfortunately, it is already too late to proceed along these lines. Several fundamental misconceptions about the nature of nonsegmental phonology, and about intonation in particular, are already widespread in the language acquisition literature. Two of these are central to any developmental discussion. The first is the view that units of intonational form represent in a one-to-one manner units of syntactic

or semantic function. A common example of this way of thinking is the claim that the change from a falling to a rising tone corresponds to a grammatical or speech-act distinction between statement and question. It may even be believed that the rising tone "expresses" the meaning of question. However, there is no isomorphism between such variables. Several adult language studies have shown that rising intonations signal a great deal more than questions, and questions are expounded by a great deal more than rising intonations (e.g., Crystal, 1969; Fries, 1964). Interpretation depends on several factors, of which the lexical, grammatical, non-verbal (especially kinesic), and situational contexts are most relevant. One also has to be extremely careful about the use of such terms as "question." If the term is already being used in a formal syntactic sense (covering the use of question-words and subject-verb inversion in English, for example), then it would be misleading to use it for the semantic effect produced by an intonational change. To say that *He's còming* → *He's còming* is a change from "statement" to "question" may seem plausible at first, but when one considers the identical intonational substitution on the following pair of sentences, the usage becomes confusing: *What's he dòiing?* → *What's he dòiing?* One could hardly say that the "question" has become a "question." Rather, one needs to talk in terms of the addition of "questioning, puzzled, surprised," etc. elements of attitudinal meaning. The problem is not a grammatical one; it is one of identifying and delimiting the emotional nuances involved. An identical problem would affect any analysis involving speech-act terminology.

Another reason why a one-to-one analysis of intonational form and meaning is unjustified stems from an overconcentration on intonation at the expense of other areas of nonsegmental phonology. To a certain extent, intonation (in its usual definition as "the linguistic use of pitch") can be studied as an autonomous prosodic system, but ultimately one has to adopt an integrated view, seeing pitch as one exponent of meaning, along with the other prosodic variables (loudness and duration) and paralinguistic features of language (the "tones of voice" based on variations in tension, labialization, nasalization, etc.). From a formal point of view, the distinction between intonation and these other features is fairly clear; from a semantic point of view, it is often irrelevant: a given "meaning" (such as sarcasm) is usually signalled by a range of prosodic and paralinguistic features, pitch being but one. Over the first two years of life, in fact, nonintonational features (such as variations in loudness, duration, rhythmicality, and muscular tension) are of considerable importance in the expression of meaning. This is so not only for attitudes, but also for grammatical patterning, where any adequate phonological discovery procedure for sentences at around 18 months (see below) has to refer to far more than sequences of pitch contour and pause. Two lexical items could be linked in several ways, e.g., both being pronounced with extra pitch height, loudness, longer duration, marked rhythm, or with some shared paralinguistic feature—all of which would make the use of pitch contour and pause less significant. Only these last two features are ever given systematic attention in the literature on early syntax, however.

The second central misconception concerning the nature of intonation referred to above is the view that it is a single, homogeneous phenomenon, formally and functionally, as is implied by such phrases as "the intonation shows . . .," "intona-

tion is an early development," and the enormous (and hardly classified) coverage of the term "dysprosody" in the clinical literature. The oversimplification on the formal side is evident if one briefly characterizes the primary distinctions that almost all theories of intonation provide (terminology varies), namely:

1. The basic distinction between pitch *direction* and pitch *range*. A pitch may fall, rise, stay level, or perform some combination of these things in a given unit (e.g., falling-rising on a syllable), and these directional *tones* provide one system of intonational contrastivity. Any of these tones may be varied in terms of range, however, which is seen as a quite separate system of contrasts, viz. at an average pitch level for a speaker, or higher/lower (to various degrees), or widened/narrowed (to various degrees—the ultimate degree of narrowing being, of course, monotone).
2. The intonation contrasts perceived in connected speech are not all of the same kind, and some carry more linguistic information about the organization and interpretation of the utterance than others. Four types of contrast are central.
 - a. The primary organizational distinction is the analysis of speech into *tone-units* ("sense groups," "primary contours"), namely, a finite set of pitch movements, formally identifiable as a coherent configuration, and used systematically with reference to other levels of language (segmental phonology, syntax, semantics). For example, the normal tone-unit segmentation of the utterance

John came at three/ Mary came at four/ and Mark came at five/

is as indicated by the slant lines. The assignment of tone-unit boundaries seems generally to have a syntactic function (see Crystal, 1975, Chapter 1, for a classification in English).

- b. Given the analysis of an utterance into tone-units, the next decision is the placement of the primary pitch movement, or *tonic* syllable, as in

It was a very nice party versus
It was a very nice party versus
It was a very nice party.

This is the focus of most of the discussion on intonation in the context of generative grammar, where the aim was to demonstrate that tonicity had a syntactic function (see Bresnan, 1971). This author's view basically agrees with Bolinger's (1972), that the factors governing tonic placement are primarily semantic, although it is possible to find cases where tonic placement is obligatory or disallowed for syntactic reasons, e.g.,

*it was a nice party/
 *he's going/isn't he/

- c. Given an analysis of an utterance into tone-units and tonic syllables, one may then decide on the tone for those syllables—if rising, falling, or whatever, along with a specific pitch range. These features seem to signal

primarily attitudinal information, although certain tonal contrasts can expound grammatical contrasts, e.g., utterance end versus continuation, as in

would you like beer/ or whiskey/ or tea/

compared with

would you like beer/ or whiskey/ or tea/

In written English, the former would be concluded with a period, the latter probably with a dash or dots (. . .).

- d. Other pitch features of the tone-unit may then be decided, the most important being the height of the first prominent syllable, the change-points within the overall contour, and the height of any unstressed syllables.

Roles of Intonation

The homogeneity view of intonation also produces an oversimplified account of the function of this feature of language. It is possible to distinguish at least four roles for intonation in English.

Grammatical In the grammatical role, pitch is being used to signal a contrast, the terms of which would be conventionally recognized as morphological or syntactic in the rest of a grammar, e.g., singular/plural, present/past, positive/negative. These contrasts are common in tone languages, but they may also be found in English, where tone-units, tonic syllables, and tones can perform a grammatical role, as in the distinction between restrictive and nonrestrictive relative clauses:

my brother/ who's abroad/ wrote me a letter/ (= one brother)
my brother who's abroad/ wrote me a letter/ (= 1+ brothers).

In a secondary sense, pitch may also be used to reinforce a grammatical distinction already overt in word order or morphology, as in the obligatory tone pattern on parallel coordinations such as

I liked the green dress/ and she liked the red one/.

Semantic The semantic role subsumes both the organization of meaning in a discourse, and the reflection of the speaker's presuppositions about subject-matter or context. Under the first heading, the highlighting of certain parts of an utterance is often carried out by intonational means (and analyzed in terms of such distinctions as "given" versus "new" information, or the "focus" on marked patterns of word order—see Quirk, Greenbaum, Leech, and Svartvik, 1972, Chapter 14). This includes the use of intonation to emphasize the relatively unfamiliar item in a sequence, as Bolinger argues in his critique of the generative account of tonicity (1972), e.g., *clothes to wash* versus *clothes to launder*. Under the second heading is included the interactional use of intonation, as when the focus on a specific lexical item presupposes a specific context immediately preceding, e.g.,

there were three books on the table/

implying a context in which the number of books was in doubt (cf. Chomsky, 1970).

Attitudinal The attitudinal role is the traditionally recognized function of intonation, whereby personal emotions are signaled concerning the subject matter or context of an utterance, e.g., anger, sarcasm, puzzlement, emphasis.

Social In the social function, intonation signals information about the socio-linguistic characteristics of the speaker, such as his sex, class, professional status, and so on (see Crystal, 1975, Chapter 5). In language acquisition, the importance of this function is beginning to be recognized in relation to such notions as role play (cf. Sachs and Devin, 1976), but of all the functions of intonation, it is the least well studied, either for child or adult language use.

In short, there are evident grounds for a more sophisticated awareness of the form and function of intonation patterns when commencing the analysis of early child utterances. In particular, being aware of the main issues of theoretical debate in the adult literature (such as the relevance of "emic" models of analysis, or the relationship between intonation and syntax) would provide a perspective that might forestall the premature construction of theories of acquisition where intonation is made to take a weight it cannot legitimately bear (see below).

ACQUISITION OF INTONATION

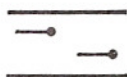
Contrastivity of Intonation

Remarks about the acquisition of intonation are scattered, selective, and largely impressionistic, as one well-known conference discussion displays very clearly. This author has reviewed the relevant literature elsewhere (Crystal, 1973). On the basis of the very limited empirical study that has taken place, it seems premature to talk in terms of stages of development in this area. On the other hand, the available evidence is suggestive of a general developmental progress that can provide a useful working hypothesis for application to clinical problems.

Awareness of Voice Tone Awareness of tone of voice involving pitch direction and range has long been known to be present in children from around two to three months (the tradition is well summarized in Lewis, 1936), but experimental studies are lacking that: a) systematically distinguish pitch from other prosodic variables, and b) distinguish between phonetic and phonological contrastivity. The kind of contrast in pitch that Kaplan (1970) demonstrated could be discriminated from around four months (emphatic falling and rising tones) is of considerable interest, but it is a fact of unclear linguistic (i.e., phonological) significance. Likewise, there are problems in evaluating the nature of the language-specific contrastivity in the productive use of pitch that Jakobson, Tervoort, and others have claimed to be apparent in children's vocalizations from around six months (see Huxley and Ingram, 1971, pp. 162-3; Crystal, 1973). It is fairly clear that the pitch patterns detectable in the crying and babbling of children in the first six months are nonlinguistic in character, but how and how soon phonological contrasts in pitch emerge is controversial (cf. Olney and Scholnick, 1976). Recognition of language-specificity involves both phonetic notions of "community voice quality" (e.g., the characteristic

“twang” of a language) and phonological notions of accent, and distinguishing these aspects in early vocalization is inevitably a problem.

Learned Patterns Evidence of “learned” patterns of intonational behavior in the second half of the first year can be interpreted both semantically and syntactically. Under the former heading, one would argue for an interactional function of intonation as a means of signaling participation in an action sequence shared by parent and child. This point, emphasized by Bruner (1975a,b) and several ethologically-orientated studies (reflected in Richards, 1974), reflects a theory of development wherein vocalization is seen as playing a role in communication that is also performed by nonvocal behavior, such as reaching or eye contact. That there is institutionalized variation in interactional behavior using vocalization is evident from several studies in which cultural and social factors have been shown to affect the quantity as well as the quality of the utterance (e.g. Blount, 1970; Tomlinson-Keasey, 1972), pitch being a salient differential indicator. The development of “turn-taking” also involves prosodic delimitation, as Bruner points out in his studies of the joint behavior of parent and child in “peep-bo” routines, and action sequences involving a prosodic climax (see Bruner, 1975a). It is as yet unclear how far the intonational component in such vocalization patterns is an independently functioning variable (as opposed to being a subordinate element within a gestalt), but this way of viewing it seems the more plausible, given the tradition summarized in Lewis (1936), the evidence of perceptual studies on the early development of pitch, music, etc. (Friedlander, 1970; Fridman, 1974), the greater stability of intonation patterns compared with segments (e.g. Lenneberg, 1967, p. 279), and so on. In one child studied at Reading, the phrase *all gone*, regularly said by the parent after each meal, was rehearsed by the child using the prosodic component only: the child hummed the intonation of the phrase first, viz.



and then attempted the whole, producing an accurate intonation but only approximate segments ([^?d^]).

Prosodic Patterns The delimitation of units of communication in dialogue provides the basis for the development of prosodic patterns whose systematic status becomes gradually more determinate during the second half of the first year. What is unclear is whether the best way of explaining the use of these patterns is to use syntactic, semantic, or sociolinguistic metalanguage. There is general agreement as to the formal features involved: the organization that comes to be imposed upon early vocalization and babble is prosodic—primarily an intonation-cum-rhythm unit followed by a pause. This unit has been labeled a prosodic “envelope” or “matrix” (Bruner, 1975a, p. 10), a prosodic “frame” (Dore, 1975), and a “primitive prosodic unit” (Crystal, 1971); Weir (1966) had earlier talked about the splitting up of utterances into “sentence-like chunks” at this stage. Bruner sees the function of these prosodic units as “place-holders.” A mode of communication (such as a demand, or a question) is established using prosody, and primitive lexical items are

then added. Dore refers to the formally isolable, repeated, and situationally specific patterns observed at this stage as "phonetically consistent forms," whose "proto-phonemic" segmental character is complemented by a distinctive prosody. It is the prosodic marker that is the more stable. In one child studied at Reading, the end of any jargon sequence was marked with a predictable pitch movement



within which, there was, however, considerable segmental phonetic variation. By the end of the first year, formal features of this general kind seem well established.

This stage has attracted much recent attention under the heading of the "pragmatics" of language development. The main viewpoint seems to be that various speech acts can be postulated based on the formal features of these early utterances, and intonation is usually cited as primary evidence. Dore, for example (1975, p. 31 ff.), argues that intonation patterns are crucial. Primitive speech acts are said to contain a "rudimentary referring expression" (lexical items) and a "primitive force indicating device" ("typically an intonation pattern," p. 31), as in labeling, requesting, and calling. The distinction between referent and intention is pivotal: "whereas the child's one word communicates the notion he has in mind, his prosodic pattern indicates his intention with regard to that notion" (p. 32). The point is taken up by Bruner (1975a, p. 19), among others. The approach is attractive, especially because it suggests a way around the intractable problems raised by the notion of holophrasis, but it raises its own problems. The trouble, of course, is empirical verification. The fact that parents interpret their children's intonation systematically is no evidence for ascribing their belief patterns to the child's intuition. Therefore, how, in principle, can one know that a child at this age intends a distinction between *calling* and *greeting* (two of Dore's categories)? Searching for 1-1 correlations between intonation and the child's own behavior is unlikely to be successful, partly because of the indeterminacy of the situations in which the language is used, and because there are fewer pitch patterns available than there are situations to be differentiated (cf. the comment on isomorphism above). It is possible that more detailed behavioral analyses will give grounds for optimism, but for the present such approaches seem to be in great danger of being determined as unfalsifiable.

Tonicity and Tonal Contrastivity Within these prosodic frames, it is unclear if tonicity or tonal contrastivity develops first, or if they emerge simultaneously. Evidence is mixed, and largely anecdotal. The suggestion about parallel development is based on the observation that tonicity contrasts are more in evidence in jargon sequences (in which sequences of rhythms are built up that reflect the intonational norms of connected speech), whereas tone contrasts are early heard in the use of such lexical items as single-word sentences. If one ignores the jargon, however, as being a less central communicative "style," then it would seem that tone develops before tonicity. Polysyllabic lexical items at this stage tend to have fixed tonic placement, although they may vary in terms of pitch direction and range, e.g., *dàda* (said as daddy enters the room), *↓dàda* (said when a noise was heard outside). Based on

samples taken from five British children between 9 and 15 months, early tonal contrasts seemed to develop as follows:

˘ versus ˆ	(the latter especially for query)
˘ versus ˆ	(the latter for surprise, insistence, etc.)
ˆ versus ˘	(especially in playful, anticipatory contexts)
˘ versus ˆ	(especially for "aren't you good" contexts, e.g., <i>clever bôy/</i> , or for being impressed, e.g. <i>bûs/</i> versus <i>bûs/</i>)
˘ versus ˘	(especially in warning contexts, e.g., <i>be càreful/</i>)
ˆ versus ˆ	(especially in play contexts)

These features appear on isolated lexical items to begin with, and later come to be used in sequences—the "contrastive syntagmas" and intonational "substitution games" reported by Carlson and Anisfeld (1969, p. 118), Eisenson, Auer, and Irwin, (1963), Keenan (1974, p. 178), Weir (1962), and others, noticeable from around 18 months. Halliday (1975) reports several sequences of this kind, from around 15 months, e.g., the distinction between seeking and finding a person, signaled in his child by high versus mid-low pitch range (p. 154).

An important theoretical question here is how far these formal distinctions are genuinely semantically contrastive for the child. It is insufficient to show that adults can differentiate these patterns and give them consistent interpretations (cf. Dore, 1975, p. 29, Menyuk, 1971, pp. 61–62, Menyuk and Bernholtz, 1969). As Bloom points out (1973, p. 19), this is not evidence of contrastivity for the *children*. On the other hand, it does not necessarily follow that there is no contrastivity at all at this stage. In the absence of detailed behavioral analyses, and given certain fundamental limitations of the descriptive apparatus used (see below), such a conclusion would be premature. There are two main theoretical positions taken up. One argues that intonation by itself is evidence of grammatical structure (Brown, 1973; Menyuk, 1971). The other argues that intonation comes after the development of syntax, especially word-order (Bloom, 1973). The former position is clearly found in Brown (1973), who argues for the sequence "intonation" → "meaning relations" → "syntax":

It is the use of intonation contours to mark word sequences as in construction, rather than word order, that is the single universal syntactic device of Stage I. And it is ultimately the relational interpretability of these constructions, heard in context, that justifies attributing relational semantic intentions to the child (p. 43).

The point is also made by Clark, in her review of Bloom (1975, p. 178). The trouble is that Brown's views are not wholly empirically based. As was argued in this author's review of Brown's recent book (Crystal, 1974, p. 296), he seems to have analyzed only one of the children intonationally (see Brown, 1973, p. 52), and hardly any of the data provided to illustrate his work are given an intonational transcription. Bloom's arguments, on the other hand, seem at first sight more well-founded empirically. She represents the second theoretical position, arguing for the sequence "meaning relations" → "syntax" → "intonation." She cites the evidence that in her data, early utterances (at 16 months) apparently had what she refers to as sentence prosody (single contour, no pause), whereas later utterances (around 19–22 months) did not, and only much later still (around 28 months) did sentence prosody clearly

emerge. On the basis of this, she (citing work by Lahey) argues that the early prosodic patterns could have had no contrastive force, and that the "unified" patterns observed must have been attributable to a process of mimicry of adult contours (the way babbling is often said to be a mimicry of segmental features, or the use of "unanalysed wholes" in syntax, whose role in development seems to have been much underestimated, cf. Clark, 1974). Intonation, as a productive linguistic system, has to be "re-learned" phonologically after the development of the word order contrasts that constitute syntax proper.

Any attempt to resolve this debate will have to recognize three possible views about the status of early pitch movements: 1) they are in free variation, 2) they are phonologically contrastive, and 3) they are invariant with reference to the segmental features of utterance (i.e., prosodic "idioms"—a not infrequent phenomenon, as Halliday, 1975, argues). The first two positions, unfortunately, depend totally on a prior specification of the notion of situational context, within which concepts of variation or contrastivity can be defined. The trouble is, as adult intonation studies have repeatedly shown over the past twenty years, that this notion of context cannot readily be specified in clear behavioral terms. Moreover, as this author has argued elsewhere (Crystal, 1975, p. 31 ff.), this notion cannot be explicated without reference to other kinds of "context" (of a lexical, syntactic, intonational, and semiotic kind), most of which information is simply not available at the stage of child development with which we are dealing. It may be a theoretical impossibility to resolve the issue at this stage. On the other hand, it would be premature to conclude this without carrying out the same procedures as have characterized the progress of ideas in adult work, in the first instance making a narrow auditory phonetic analysis of early vocal behavior. The surprising thing is that this has not been done for either position. There has been a tendency to use acoustic specifications of events, at one extreme, and vaguely defined constructs, such as "falling" and "rising," at the other. What is lacking is a reasonably comprehensive account of the whole range of nonsegmental variables that characterize vocalization during this period—in much the same way as increasingly detailed descriptions of early infant vocalization have come to be made (e.g., Stark, Rose, and McLagen, 1975). This would show, for instance, that a specification of intonational contrastivity in terms of direction alone is not enough; range of pitch is equally crucial. This can be seen from Halliday's excellent attempt at a phonetically accurate account. For his analysis, he needs eight pitch range variations (very high, high, mid-high, mid, mid-low, low, wide, narrow), as well as four directions (level, fall, rise, rise-fall), and other prosodic and paralinguistic features (slow, short, long, loud, sung, squeak, frictional, glottalized). Range is particularly important in his study, this (mid versus low, later high) being used far more often in the identification of early items than is direction. Given these kinds of variability, it is therefore very much an open question as to what different scholars are thinking of phonetically when they talk about "falling" versus "rising" contours and the like. The notion of "sentence prosody," pivotal in the above debate, cannot be taken as a primitive term.

Likewise, the situational concepts introduced into the debate cannot be taken as self evident. In much the same way as has been argued for syntax and segmental phonology (Howe, 1976; Lenneberg, 1967), it is necessary to free the mind from the

constraints of adult language studies, where situational notions such as "question," "command," and "statement" are normal. Given some precise notion of "rise" versus "fall," it will not always (ever?) be the case that the semantic specifications of this contrast will be identical to those required for the analysis of the contrast in the adult language. Halliday, once again, provides cases where it is evident that the child's use of the pitch contrast is not the same (e.g., 1975, pp. 29, 52). For a while, his child used rising tones for all "pragmatic" utterances (those requiring a response, in his terms), and falling tones for all "mathetic" utterances (those not requiring a response). In a child studied at Reading, the falling-rising tone was initially used only in smiling-face contexts, with a generally "playful" meaning, and never to express doubt or opposition with a frowning or neutral face, as it frequently does in adults. In another case (see Crystal, 1971), a child began to use English as if it were a tone language, in certain limited respects, e.g., he referred consistently to any vehicles that made an engine noise as "bus," with a low falling tone, but when a *real*, big, red, double-decker bus went by, he would say "bus" with a wide rising-falling tone. It would seem, on the basis of examples such as these, that we are but at the beginning of seeing the child "in his own terms" with respect to the tonal features of his intonation system.

Tonicity and Two-Word Utterance Tonicity (or "contrastive stress," as it is often misleadingly called) becomes apparent around 18 months, as two-word utterances appear (Bloom, 1973; Brown, 1973; Clark, Hutcheson, and Van Buren, 1974, p. 49). There seems to be general agreement about the developmental process, at least in outline. First, lexical items that have appeared independently as single-element utterances, marked thus by pitch and pause, are brought into collocational relationship. At first, the lexical items retain their prosodic autonomy, with the pause between them becoming reduced, e.g., /teddy/ chair/. Often, long sequences of these items appear, especially repetitively, e.g., /man/ there/ man/ there/. Such sequences are unanalyzable into conventional grammatical/semantic relations. There is no nonarbitrary way of demarcating pairs or triples of these items to fit in with contemporary models of meaning-relations, etc. Word order, at this point, seems to be far more random than was expected in the early linguistic studies of syntactic acquisition (cf. the summary in Brown, 1973).

The next step is the intonational integration of sequences of items, usually two, into a single tone-unit. The empirical evidence for this step is extremely limited, but it is a common subjective impression among those working in this field. One item is made more prominent than the other(s); it is the only one to have an identifiable pitch movement—there is a rhythmic (isochronous, for English) relationship between the items, and intervening pauses become less likely in repeated versions of lexical sequences. This step is considered to be of central theoretical importance, either for the notion of meaning-relation or grammatical sentence, e.g., Brown (1973, p. 182):

What expressive means does the child employ in talking about the relations he understands? Most generally the simple concatenation under one utterance contour of the words which interact to create a compositional meaning that is different from the meanings of the two words in sequence.

There are problems here, however: "There is no problem ordinarily in distinguishing a two-word utterance from two single-word utterances because the child ordinarily controls prosodic features which make the difference obvious even to the phonetically untrained" (Brown, p. 148). If only this were so. The awkward fact is, however, that samples of data regularly produce sequences like the following:

- | | | | |
|----|--------|------------|--------------------------------|
| 1. | /gírł/ | /slèeping/ | (picture of girl sleeping) |
| 2. | /gírł/ | /pìano/ | (picture of girl at a piano) |
| 3. | /gírł/ | /bòy/ | (picture of a girl and a boy) |
| 4. | /gírł/ | /nò/ | (picture of a girl-like thing) |
| 5. | /gírł/ | /gírl/ | (picture of a girl) |

The intonation and pause patterns may be identical in each case—for the sake of argument, let us say the more prominent item is the second—so if one is being consistent, the reasoning that would lead one to set up a compositional meaning for the first sentence (plausibly subject + verb, or some such specification) has to be used for the others. One cannot bring in intonation as a discovery procedure at one place, and then leave it out whenever the compositional meanings that as a result would appear do not seem to be permitted by one's a priori views as to what meaning relations can be. However, this seems to be what happens in the literature. Everyone would accept the legitimacy of the analysis of the first "sentence," but as one proceeds down the list, decisions become more and more uncertain—(2) locative?, (3) coordinative??, (4) corrective???, (5) repetitive??? Indeed, there will be a point at which situational factors will intervene and suggest the absurdity of searching for a single sentential interpretation, when all that is happening is that there are two sentences being said in a hurry. The adult language provides countless cases: /yes I'm hère/, /I'm terribly sorry I'm late the bús was late/, etc. In the case of the child, where syntactic controls are lacking, the whole argument is thrown back onto the criteria of situation ± parental interpretation, which are notorious in their indeterminacy, as has been observed.

Despite these problems, several scholars have gone on to analyze data at this stage within some kind of contrastive semantic framework. Brown, for example, claims that one can distinguish *that book* as being Determiner + Noun as opposed to Subject + Complement on suprasegmental grounds, the first being $\acute{ } \grave{ }$, the second $\acute{ } \acute{ }$. Wieman (1976), following up reports by Bowerman (1973) and others, observes that certain syntagmas tend to have predictable stress (e.g., Possessive + Noun has the possessive stressed, Subject + Object has the object stressed). In her data, again, she found that Verb + Locative always had the locative element stressed, whatever the syntactic category (e.g., *coming up*, *play museum*, and that this was a more consistent feature than word order (e.g., *rug jumped*, said as the child jumped from a box onto a rug). There are considerable difficulties in working in this way, however. For instance, Wieman (1976) reports that Agent + Verb combinations always had stress on the verb, but adds, "an agent was never stressed by any of the children in a non-contrastive, non-emphatic utterance." How is this to be determined? How is the notion of personal emphasis to be verified? The same point applies to Wieman's general theory, that new information in a sentence affects the stress placement, whereas old information does not, e.g., *One marble missing. See*

marble breaks the expected Verb + Object pattern, because *marble* is old information the second time. How does one know that what is new to the observer, interpreting the situation in terms of adult expectancies, is also going to be new to the child? Wieman's theory predicts that having been told to wash hands, the child will say, e.g., /*my hànds/ dírtý hand/*, but this author has several examples of the type /*nòt wanna wash hands/ not clean my hànds/*. Wieman would presumably say that this was therefore contrastive, but this would only be so by definition, and the dangers of circularity are evident.

There are, of course, several well-recognized difficulties in working with any theory of the "given-new" type (cf. other informational dichotomies, such as topic/comment, rheme/theme), all of which emerge with force in the case of intonation. For instance, after one makes the initial distinction (assuming this to be possible), then what? How does one analyze types or degrees of newness or oldness, and thus make the theory fruitful in hypotheses? What does one do with compound tones, such as /*I mìght kíck that ball/*? It seems to me that there is a great deal of detailed analytic work that needs to be done before we can proceed to the stage of utilizing theories of this kind in the analysis of intonation. There are, on the other hand, some extremely specific hypotheses that need to be investigated, e.g., that tonicity contrasts signal the development of the child's awareness of lexical sets (e.g., color terms, as in /*I gotta réd brick/ you gotta grèen one/*) or grammatical systems (as with possessive pronouns in /*mý brick/ yòur brick/*). Certainly such uses develop long before the use of tonicity to mark personal emphasis or other affective states, as in the adult /*yóu/ múst/ gò/ nòw/*.

To trace the subsequent development of the relationships between tone-units, tonicity, and tone is a major task that the literature largely ignores. To an appreciable extent, it largely depends on the prior understanding of the acquisition of grammatical and social awareness—e.g., one can discuss the intonation of relative clauses at that point in development when the corresponding syntactic patterns emerge. What perhaps needs emphasizing is that full learning of the various functions of intonation takes several years. Cruttenden (1974), for example, has recently pointed out that the more subtle contrasts involved in the use of pitch range and direction are still being acquired at around age nine, and work on the later development of syntax and semantics is continually referring to the role of intonation in marking such things as person reference and contrastive order, e.g., /*John gave a book to Jim/ and hě/ gave one to him/*, /*it was in Woodworth's I said I'd meet you/*.

IMPLICATIONS FOR STUDIES OF DISABILITY

It is not usually appreciated how pervasive intonation is in the study of language disability. The notion of *dysprosody* is widely recognized, but little classification of dysprosodic types has taken place, and the specific problems caused by intonation in the analysis and remediation of speech and language disorders have been little investigated. The main reason for this is a failure to distinguish clearly, within the clinical literature, between the linguistic and the nonlinguistic functions of pitch. It is generally assumed that a pitch disability (e.g., excessive height, monotone,

repetitiousness) will be the result of a more general pathological condition, such as hearing loss or voice disorder. Apart from such phonetic disorders of pitch, however, one must allow for phonological disorders, where the use of pitch is abnormal (but with no evident anatomical, physiological, or neurological malfunction to account for it), and where contrasts normally available in the language are unable to be expressed.

In addition to the conceptual confusion that exists, there is also the regrettable fact that negligible descriptive work has been carried out. It is rare to find samples of data transcribed intonationally—where an impressionistic, ambiguous, punctuation is used instead (e.g., words in capitals, the use of triple dots, exclamation marks). The field, in other words, reflects the situation as it existed in general linguistics several years ago, and improvements are likely only with the development of more systematic courses of training for clinical practitioners than are normally available. Enough anecdotal information is available, however, to see the general directions in which research in this field should move.

The formal and functional frameworks proposed in the earlier part of this paper can be used in order to suggest a preliminary classification of the main types of intonational disability. All four functional types are affected—grammatical, semantic, attitudinal, and social—although the most noticeable problems, affecting the intelligibility of the utterance, relate to the first two. Specific abnormal patterns relating to each of the formal intonational categories can be found. In relation to the use of tone-units, for example, disordered speech may display two very different tendencies: a patient (P) may overuse tone-units, giving the impression of speaking a word at a time, or tone-units may be underused, giving the impression of speaking without paying attention to punctuation. A sequence of tone-units may also be abnormal if it introduces inappropriate contrasts in pitch range, such as giving a main clause (containing the central “information” of an utterance) a low pitch range relative to the surrounding level, and thus giving an impression of parenthesis. Under the heading of tonicity, it is common to find structures in which the wrong item is stressed (e.g., *one egg or two, it was nice*), as well as patterns that show that P has not taken into account the linguistic context of his utterance (e.g., *Who's got a ball? P: The man's got a ball.*). Under the heading of tone, one may find confusion of both pitch direction and pitch range, e.g., using a falling tone instead of a rising one, thus losing the contrast between continuity and finality (and making it difficult, for instance, to know whether an utterance is finished). A further example from one child was *me got one*, where the falling-rising tone replaced the negative element in expressing the meaning *I haven't got one*.

In remediation, the role of the teacher or therapist (T) in maintaining controlled intonation patterns is crucial. T needs to avoid varying intonation tunes too much, especially with a P in the early stages of language development. Bearing in mind the tendency of children at these stages to respond to the intonational rather than the verbal aspects of utterances, altering the intonation of a set of stimulus sentences is often tantamount to presenting quite different utterances to the child. The intonational profile of */the¹ man's¹ kicking the ball/* and */the man's¹ kicking the¹ ball/*, to a child, especially one with restricted perceptual and comprehension

skills, would be very different. An illustration of the way in which a varied stimulus can condition an abnormal response is, T: *There's a càt. It's a little cat.* P: *There little.* Another example came from a drill sequence being used by T: *It's a Nòun. What is it?* P: *It's a Nòun.* After several of these, T switched to *It's an Àdjective Noun*, and P, instead of following the syntax/semantics, followed the intonation, producing *It's an Àdjective.*

Several other examples of the use and treatment of abnormal intonation patterns can be found in Crystal, Fletcher, and Garman, 1976, Chapters 7 and 8. However, the role of intonation in facilitating the development and use of lexicon and grammar in the various clinical conditions has received hardly any systematic study, and it is difficult to generalize on the basis of examples such as these. The function of intonation in developing sequencing, recall, memory, and other abilities has also attracted some attention (e.g., Goodglass, Fodor, and Schulhoff, 1967; Stark, Poppen, and May, 1967), but the studies are again very restricted. It is to be hoped that, with further descriptive and experimental studies, a proper empirical perspective for discussing the theoretical issues raised in this paper will emerge.

REFERENCES

- Bloom, L. 1973. One Word at a Time. Mouton, The Hague.
- Blount, B. G. 1970. The pre-linguistic system of Luo children. *Anth. Ling.* 12: 326-42.
- Bolinger, D. L. 1949. Intonation and analysis. *Word* 5: 248-54.
- Bolinger, D. L. 1972. Accent is predictable (if you're a mind-reader). *Lg* 48: 633-44.
- Bowerman, M. 1973. Early syntactic development. C.U.P., London.
- Bresnan, J. W. 1971. Sentence stress and syntactic transformations. *Lg* 47: 257-81.
- Brown, R. 1973. *A First Language*. Harvard University Press, Cambridge.
- Bruner, J. S. 1975a. The ontogenesis of speech acts. *J. Child Lang.* 2: 1-19.
- Bruner, J. S. 1975b. From communication to language: A psychological perspective. Mimeographed.
- Carlson, P., and Anisfeld, M. 1969. Some observations on the linguistic competence of a two-year-old child. *Child Dev.* 40: 569-75.
- Chomsky, N. 1970. Deep structure, surface structure and semantic interpretation. In R. Jakobson and S. Kawamoto (eds.), *Studies in General and Oriental Linguistics*, pp. 52-91. Tokyo.
- Clark, R. 1974. Performing without competence. *J. Child Lang.* 1: 1-10.
- Clark, R. 1975. Review of L. Bloom (1973). *J. Child Lang.* 2: 169-83.
- Clark, R., Hutcheson, S., and Van Buren, P. 1974. Comprehension and production in language acquisition. *J. Linguist.* 10: 39-54.
- Cruttenden, A. 1974. An experiment involving comprehension of intonation in children from 7 to 10. *J. Child Lang.*, 1: 221-31.
- Crystal, D. 1969. *Prosodic Systems and Intonation in English*. C.U.P., London.
- Crystal, D. 1971. Prosodic systems and language acquisition. In P. Léon (ed.), *Prosodic Feature Analysis* pp. 77-90. Didier, Montreal.
- Crystal, D. 1973. Non-segmental phonology in language acquisition: A review of the issues. *Lingua* 32: 1-45.
- Crystal, D. Review of R. Brown (1973). *J. Child Lang.* 1: 289-307.
- Crystal, D. 1975. *The English Tone of Voice*. Edward Arnold, London.
- Crystal, D., Fletcher, P., and Garman, M. 1976. *The Grammatical Analysis of Language Disability*. Edward Arnold, London.

- Dore, J. 1975. Holophrases, speech acts and language universals. *J. Child Lang.* 2: 21-40.
- Eisenson, J., Auer, T., and Irwin, J. 1963. *The Psychology of Communication*. New York.
- Fridman, R. 1974. *Los comienzos de la conducta musical*. Paidós, Buenos Aires.
- Friedlander, B. Z. 1970. Receptive language development in infancy: Issues and problems. *Merrill Palmer Quart.* 16: 7-51.
- Fries, C. C. 1964. On the intonation of 'yes-no' questions in English. In D. Abercrombie, (eds.), *In Honour of Daniel Jones*, pp. 242-54. Longman, London.
- Goodglass, H., Fodor, I. G., and Schulhoff, C. 1967. Prosodic factors in grammar—evidence from aphasia. *J. Speech Hear. Res.* 10: 5-20.
- Halliday, M. A. K. 1975. *Learning How to Mean*. Edward Arnold, London.
- Howe, C. J. 1976. The meanings of two-word utterances in the speech of young children. *J. Child Lang.* 3: 29-47.
- Kaplan, E. L. 1970. Intonation and language acquisition. *Papers and Reports on Child Lang. Dev.* 1: 1-21.
- Keenan, E. O. 1974. Conversational competence in children. *J. Child Lang.* 1: 163-83.
- Kopczynski, G. 1975. Contribution à l'étude des structures prosodiques chez les enfants de 1 à 2 ans. *Proc. VIII. Cong. Phon. Sci. Leeds*.
- Lenneberg, E. H. 1967. *Biological Foundations of Language*. Wiley, New York.
- Lewis, M. M. 1936. *Infant speech*. Routledge and Kegan Paul, London.
- Menyuk, P. 1971. *The acquisition and development of language*. Prentice-Hall, Englewood Cliffs.
- Menyuk, P., and Bernholtz, N. 1969. Prosodic features and children's language production. *MIT QPR* 93: 216-19.
- Olney, R. L., and Scholnick, E. K. 1976. Adult judgments of age and linguistic differences in infant vocalization. *J. Child Lang.*, 3.
- Quirk, R., and Crystal, D. 1966. On scales of contrast in English connected speech. In C. E. Bazell, (eds.), *In Memory of J. R. Firth*, pp. 359-69. Longman, London.
- Quirk, R., Greenbaum, S., Leech, G., and Svartvik, J. 1972. *A Grammar of Contemporary English*. Longman, London.
- Richards, M. (ed.). 1974. *The Integration of a Child into a Social World*. C.U.P., London.
- Sachs, J., and Devin, J. 1976. Young children's use of age-appropriate speech styles in social interaction and role-playing. *J. Child Lang.* 3: 81-98.
- Stark, J., Poppen, R., and May, M. Z. 1967. Effects of alterations of prosodic features on the sequencing performance of aphasic children. *J. Speech Hear. Res.* 10: 844-48.
- Stark, R. E., Rose, S. N., and McLagen, M. 1975. Features of infant sounds: The first eight weeks of life. *J. Child Lang.* 2: 205-21.
- Weir, R. 1962. *Language in the Crib*. Mouton, The Hague.
- Weir, R. 1966. Some questions on the child's learning of phonology. In F. Smith and G. Miller (eds.), *The Genesis of Language*, pp. 153-168. MIT Cambridge.
- Wieman, L. A. 1976. Stress patterns of early child language. *J. Child Lang.* 3.