Toward an Operational and Logical Analysis of Intentionality: The Use of Discourse in Early Child Language

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*The more deeply I have gone into the psychology
of language, the more impressed I have become with
the absence in psychology of certain forms of
psychological analysis that are needed in the study of
language acquisition and language use generally. One
such is the role of intention and the perception of
intention in others. Language use is premised in a
massive way upon presuppositions about intentions
and about the reasons why people do or say things.
Yet psychology, or at least positivistic "causal"
psychology, ignores the role of intention and assigns
no interpretation to reasons in the regulation of
behavior. Such matters are most often treated as
epiphenomena.*

—J. S. Bruner

This chapter is about the possibility of operationalizing intention through
the analysis of conversational discourse and, more generally, the sequential
aspect of interaction behavior. My attempt to realize this possibility is
based upon the belief 1. that the logic of teleological analysis has been a

major barrier causing intention to be ignored in psychology preventing its
integration of intention into the causal paradigm of experimental psychol-
ogy; and 2. that the analysis of short, discrete units in isolation (utterances
or sentences, in the area of language and language acquisition) rather than
more extended streams of behavior has, up to now, prevented the problem
of operational definition from being approached in a systematic fashion.

Margaret Boden, a philosopher-psychologist, points out the essential
connection between these two points in her book, *Purposive Explanation in
Psychology* (1972). "The first logical criterion of teleological explanation is
the necessity of prospective reference. In 'formally mechanistic' contexts by
definition, no reference to the future need be made in explaining the occur-
ence of a present phenomenon" (p. 40). This logic of prospective reference
means that current behavior can be understood only in relation to its future
course, and this implies the necessity for studying extended behavioral
sequences, rather than the discrete behavioral "atoms" required by positiv-
istic "causal" theories. Thus, "purposive" explanation is not "atomistic."
Atomistic explanations connect independently identifiable units. Future
units may be predictable from the prior occurrence of other units, granted
certain general postulates of correlation. But the future units need not be
appealed to in any way for the initial identification of the prior units and
thus are logically isolable from them (Boden, 1972, p. 41).

Teleological analysis was out during the reign of behaviorism. For exam-
ple, in the operant paradigm, the reinforcer follows a response. The reinfor-
cer was not considered to be a goal which "causes" behavior; rather behav-
ior produces the reinforcer (Greenfield, 1971). How could something that
occurred later (the goal) cause something prior (the means)? The answer
is that a goal can have mental or cognitive existence not only before its
attainment in the outside world, but before the response itself. This psycho-
logical existence is called an intention.

The emergence of cybernetic concepts in the fifties made this formulation
of an intention as some type of cognitive model seem like a serious possibil-
ity for the first time. The appearance of *Plans and the Structure of Behav-
ior*, by Miller, Galanter, and Pribram (1960), was an important step in the
application of cybernetic concepts to the analysis of intentional behavior.
For these authors, intention refers to a plan, and the basic unit of a plan is
the freedback loop. Their feedback loop consists of four sequential phases:
Test, Operate, Test, Exit (hence the acronym TOTE). The Test constitutes
an internal model of a set of conditions discrepant from current conditions.
This discrepancy sets off the Operate phase, consisting of behavior directed
toward the elimination of the discrepancy. Repeated Tests assess whether
the discrepancy has been eliminated. When a Test results in a match
between the model and actual conditions, a stop order results and the activ-
ity terminates (Exit). Thus, the Test really consists of a model of an end
state or goal that antedates behavior itself (the Operating phase). Thus,

the TOTE has an intentional structure. The fact that Totes could perfectly well be concretized as elements in a computer program brought up the possibility of a cognitive model without necessary recourse to the elusive concept of consciousness.

The reality of such a model as more than just a useful metaphor for human behavior was enhanced by Pribram, Spinelli, and Kamback's (1967) neurophysiological findings that intention—the internal representation of a goal—can be electrically recorded in the projection areas of the macaque monkey's brain, a phenomenon labeled feed-forward or corollary discharge. It was found that this mechanism, formally parallel to the initial Test in a TOTE unit, facilitates the intended behavior which follows. However, we cannot observe corollary discharge behaviorally any more easily than we can observe the test phase in a cybernetic loop, and so we are often in a position of making inferences about the intentionality of behavior from subsequent attempts at goal attainment. Can such inferences be logically justified? And what would be the behavioral bases for such inferences? Let us approach the second question first.

Making Intention Observable: Toward Operational Definition

Bruner suggests some citeria for the operational definition of intention: "Intention, viewed behaviorally, has several measurable features: anticipation of the outcome of an act, selection among appropriate means for achievement of an end state, sustained direction of behavior during deployment of means, a stop order defined by an end state, and finally some form of substitution rule whereby alternative means can be deployed for correction of deviation or to fit idiosyncratic conditions" (1974, pp. 168-169).[1] This approach has an honorable history in American psychology going back to McDougall, who made a list of what he called "objective marks of purpose" (Boden, 1972).

However, not all these behavioral characteristics are defining attributes in the sense of Bruner, Goodnow, and Austin (1956). Searle's analysis of intentionality selects two from among this list as having definitional status: 1. directedness, roughly equivalent to Bruner's "sustained direction of behavior during deployment of means"; and 2. presentation or representation of conditions of satisfaction, roughly equivalent to Bruner's "stop order defined by an end state."[2] These criteria must now be inserted into a logical

1. Golinkoff, R. drawing on Bruner is currently utilizing these criteria as a basis for identifying intentionally communicative vocalizations in prelinguistic infants. This paper was presented at the meeting of the Society for Research in Child Development Interdisciplinary Workshop on the Development of Communication, University of Delaware, 1979.

2. Searle, J. R. Intention and action. Paper was presented at the meeting of the LaJolla Conference on Cognitive Psychology, LaJolla, California, August, 1979.

framework in order to find a home within the province of experimental psychology. This framework constitutes a positive response to the first question, above, as to whether inferences about intentionality can be logically justified. After presenting the logical framework, I shall propose ways of concretizing these criteria so that they may be observed in the stream of communicative interaction.

A Logical Analysis of Intention

The specific logical operations used to study an intention are different from those used in standard experiments, *although it is important to realize that they are but different operations within one and the same, unified logical system.* What follows is an attempt to formalize Searle's basic definition of intention. In this formalization, D is the directionality of behavior toward a specifiable goal G contained in the intention I. The condition T is the termination of the directed behavior upon attainment of G, the goal. Goal is a more common term corresponding to Searle's conditions of satisfaction. The logic of operationally establishing an intention goes as follows: if intention I exists, D and, under condition G, T follow; if intention I does not exist, neither does D or T, under condition G. From this, it follows that the presence of D and T under condition G implies I. This situation can be summarized as follows: (Key to symbols: $\rightarrow$ = implies; Λ = and; $\sim$ = not)

$$I \rightarrow D \, \Lambda \, (G \rightarrow T)$$
$$\sim I \rightarrow \sim (D \, \Lambda \, (G \rightarrow T)$$

Intention implies Directedness and (if Goal, Termination)
$$\therefore \, D \, \Lambda \, (G \rightarrow T) \rightarrow I$$

This conclusion means that if we can establish directedness and termination in the presence of the goal, we have established a particular intention.[3] What differs from the usual experimental situation is that the necessary and sufficient conditions of the Intention follow it in time. In the classical paradigm involving independent and dependent variables (Iv and Dv), the hypothesis to be proved is typically Iv→Dv. Generally there is no reason to

3. Schegloff (personal communication, 1980) points out that a given goal can be described in different ways. Operationalization of intentions does not, however, depend on a unique or common description of a particular goal; rather it requires a description such that, under similar circumstances, another observer could identify the same goal in the ongoing stream of behavior.

Schegloff also points out that a given, observable goal can result from different internal intentions. The operational definition cannot select the operative intention in a given case. Therefore, insofar as an observable goal has multiple possible intentions behind it, it seems more accurate to claim that, in a particular instance, we have operationally identified not a *particular, specific* intention, but a class of intentions defined by the goal that has been observed.

assume or attempt to prove $\sim$Iv$\rightarrow$$\sim$Dv and therefore it does not follow that Dv$\rightarrow$Iv. (Indeed, every introductory psychology student is taught that to go from Iv$\rightarrow$Dv to Dv$\rightarrow$Iv is to commit the logical fallacy of affirming the consequent.) However, in talking about the logic of an intention we are talking about interdependencies of parts in a complex intraindividual structure, in contrast to independent and dependent variables, which are by definition logically independent. In the latter case, it follows that other stimuli besides the one in question could produce a given response. However, it is not the case that directional behavior and its termination upon attainment of a goal can exist without a corresponding intention. Therefore, $\sim$I$\rightarrow$ $\sim$ (D $\wedge$ (G$\rightarrow$T)). This relationship must be true because, without an intention, how would a direction be set or a goal be recognized as such? That is to say, there is a structural interdependence among the various parts of an intention that does not exist between an independent and dependent variable in the classical paradigm of experimental psychology. Pursuing the analogy with the TOTE units of Miller, Galanter, and Pribram (1960), we can say that a feedback or cybernetic loop cannot exist without setting conditions for the initial test. This structural interdependence produces the mutual implication that does not exist in an Iv$\rightarrow$Dv paradigm. It is this situation of mutual implication that makes it logical to identify a particular intention by events which follow it in time.

Note, too, how much more complex the logic of an intention is in comparison with the logic of a standard experiment. Unlike the later, the logic of intention contains an embedded conditional component (G$\rightarrow$T), that is, (if G, then T). This conditional component produces an indeterminacy in interpreting certain behavioral phenomena. That is, if Termination occurs in the absence of Goal attainment, there might or might not be an intention. This formal consequence mirrors the situation in life: an extensive effort to realize a goal may be abandoned before it is attained if the effort is too difficult. Or the absence of goal attainment may mean that an intention was not present in the first place.

In conclusion, the logical complexity and partial indeterminacy of intentionality may well have been barriers to its acceptance in experimental psychology, especially in the absence of an explicit formal analysis to aid in the interpretation of concrete phenomena.

Analysis of Intention within an Interactional Framework

The key to an interactional approach to intention is the negotiated interpretation of intention. Considering the period in which children are making the transition to language, researchers have often raised the question as to how we know the mother's interpretation corresponds to the child's actual

intention, something actually going on within the child (Howe, 1977; Rodgon, 1977; Ryan, 1974). People do not generally ask how we know whether the child's interpretation of the mother's intention is correct at this stage. One reason is that the question has not been looked at interactively from the child's point of view. That is, no one worries about what the child's interpretation of the situation is. One only wants an "objective" description of behavior and the child's interpretation (if it could be known) is considered superfluous to this end. This is so because language is given privileged status as behavior and the mother's intentions, occurring in linguistic form, are taken at face value as "objective" facts. In contrast, the child's interpretations, occurring on the level of action and visual behavior (that is, the sensorimotor level) are not valued and generally not even noticed.

The processes of mutual interpretation that go on in communicative interaction, as manifest through microanalytic techniques, can, however, reveal observable signs of the two major features of intentionality: directionality and terminal requirements (Bruner, 1974) and go beyond the solipcism of each participant's interpretation of the other participant's intention. This interactional approach draws heavily on conversational analysis in sociology as developed by Schegloff and Sacks (1973), but does not necessarily stay within it bounds.

My example will draw from the analysis my students and I have made of the comprehension of offers, both both verbal and nonverbal, by young children just starting to talk (Reilly, Zukow, and Greenfield, 1978; Zukow, Reilly, and Greenfield, 1979). From viewing and reviewing videotapes of naturally occurring communication in the home, the following interactional model of the general structure of an offer sequence was developed:

I. Offer establishment
   a. Offer presentation: Within an ongoing interaction the caregiver establishes the topic of the offer as well as the fact that an offer is in progress, that is, the communicative force (offer) and propositional content (object or activity) are presented.
   b. Offer acknowledgment: The child's behavior not only is appropriate as a response to the offer presentation (Ia) but also establishes the offer presentation interactionally, i.e., shows that is was taken to be an offer. Further, the acknowledgment elicits either realization or nullification (IIa).
II. Offer consummation
   a. Offer realization or nullification: The caregiver displays that she has assessed that the child's prior behavior constitutes an offer acknowledgment (Ib). This display facilitates the enactment (IIb) of the offer in the case of positive acknowledgment (Ib) or terminates the offer in the case of a negative acknowledgment (Ib).

b. Offer enactment: In the case of positive acknowledgment (Ib) followed by an offer realization (IIa), the child consumates the offer by taking the object, performing the activity, or refusing to do so.

The breaking down of the offer into these minute components allows intentionality to become observable and therefore operationally identifiable. That is, we may now observe directionality of behavior and termination of directional behavior in the presence of the goal. Here is an example from our data laid out in this interactional framework:

I. Offer establishment
   a. Offer presentation: "Do you want a cookie, Jim?"
   b. Offer acknowledgment: Jim begins to reach for the cookie.
II. Offer consummation
   a. Offer realization: Mother finishes bringing cookie to child.
   b. Offer enactment: Child grasps cookie.

The first part of the offer establishment, Ia, "Do you want a cookie, Jim?" is hypothesized to represent the intentional offer of a cookie on the part of the mother. As a speech act, the offer implies a communicative intention to be acknowledged as an offer. This implies a particular intention: the commitment to give the object of the offer to the other person if the other person shows evidence of positive feeling toward it. (This definition of the offer as a particular sort of intentional structure is based on Searle's [1975] analysis of commissives.) To confirm our hypothesis concerning the existence of these intentions, we must establish conditions D and (G→T). With respect to this intention, evidence for D (directionality) in the mother's behavior is provided at IIa where mother finishes her movement of bringing the cookie to the child, following the child's demonstration at Ib of positive feeling toward the offer by beginning to reach for the cookie. Two ordered points are needed to establish a direction. Item IIa establishes directionality because it follows Ia and therefore constitutes the second point. Evidence of termination (T) of directional behavior in the presence of G is also implied by IIb: For the child to grasp the cookie, the mother must *stop* doing or terminate what she was doing at IIa, holding onto the cookie while passing it to the child; that is, mother lets go of the cookie.

Directionality in fulfilling the communicative intention to have the offer acknowledged can be demonstrated only where there is not immediate acknowledgment, where, unlike the offer under discussion, Ib did not, in fact, follow directly after Ia. We must look at offers where immediate acknowledgment does not occur in order to find at least two behavioral points going in the direction of obtaining acknowledgment. In this offer, for example, after the initial offer presentation at Ia, the mother gets an actual cookie (absent until now) and re-offers, on the sensorimotor level rather

than linguistically, extending the cookie to Jim. Re-offers such as this one establish directionality of behavior vis-à-vis the intention to have the offer acknowledged. Once acknowledgment occurs, the phase of offer presentation ends, its termination condition fulfilled. Thus, it is just where the intended consequences do not immediately occur that the intentional structure becomes most visible. One of Bruner's criteria of intention is apparent in this example: the re-offer of the sensorimotor level manifests the mother's ability *to substitute alternative means* where necessary.

On the child's side, we can also find evidence of directional behavior and its termination in the presence of the goal. In the case of the child, our hypothesis is that he has the intention to accept his mother's offer. His behavior of starting to reach to the cookie at Ib establishes the first point in a particular direction. Grasping the cookie at IIb constitutes a second point in the direction, as well as the termination of the activity of getting the cookie.

The interactively negotiated nature of intention is demonstrated in this example. The child's acknowledgment at Ib (beginning to reach) constitutes an interpretation of the caregiver's intention to offer. Schegloff and Sacks generalize about the usefulness of pairs such as Ia and Ib: What two utterances produced by different speakers can do is: by an adjacently positioned second, a speaker can show that he understood what a prior aimed at, and that he is willing to go along with that. Also, by virtue of the occurrence of an adjacently produced second, the doer of a first can see that what he intended was indeed understood, and that it was or was not accepted (1973, pp. 297–298). This described the situation perfectly, except that we include nonverbal components as possible members of a pair. Schegloff and Sacks restrict their analysis to the linguistic parts of communicative interaction, but there is no theoretical barrier to extending it to the nonverbal components of dialogue. Note, in fact, that the analysis applies as well to the child who reaches toward what has been offered as to the child who says, "Yes."

The caregiver's enactment of the offer at IIa (bringing cookie to child) constitutes an acceptance of the child's previous interpretation of the interaction as an offer by establishing the directionality of her own behavior. This move also constitutes an interpretation of the child's intention to receive. The next move of the child, taking the cookie at IIb, manifests his own directionality and thus constitutes an acceptance of the caregiver's interpretation of his intention. In this way person B's collaboration with person A's intended plan provides behavioral evidence for person B's perception of person A's intention. Consequently an interactive analysis not only throws each participant's own intentions into relief, it also illuminates how each perceives the intentions of the other.

At both IIa and IIb, the acceptance of the other participant's interpretation of one's own intention does not necessarily mean that the interpretation

was accurate and that we know the first person's original intention. It does mean that this interpretation is currently acceptable as a basis for further action. Hence the interaction displays a mutually negotiated interpretation of the intention of each participant. Because each interpretation may influence the other's next move, there is really no way of knowing the original intention of either participant.[4] However, the agreed upon interpretation of each person's intention in the dyad is an important phenomenon in its own right. Note, too, that complementary intentions are necessary between the parties for either party's intention to be carried out. For instance, the child's intention to accept an object cannot be carried out without the mother's intention to give it to him.

Intent and Consciousness: Searle's Distinction between Prior Intention and Intention in Action

. . . intent in communication is difficult to deal with for a variety of reasons, not the least demanding of which is the morass into which it leads when one tries to establish whether something was *really*, or *consciously* intended. Does a prelinguistic infant consciously intend to signal his displeasure or express his delight? (Bruner, 1974–1975, p. 262).

Searle has most recently made a distinction which seems to obviate the need to decide on consciousness.[5] This is the distinction between intention-in-action and prior intent. The latter involves *representation* of conditions of satisfaction, whereas the former involves mere *presentation*. That is, in prior intention there is some mental model of the conditions of satisfaction *before* the action begins. In intention-in-action the conditions of satisfaction are implicitly present *during* the intentional action. There need not be an explicit representation, such as a visual image or a linguistic formulation. Prior intentions include intentions in action, but not vice versa. For example, "I intended to raise my arm," followed by the act of doing so constitutes a prior intention followed by an intention-in-action; this intention-in-action is actually a component of the prior intention. If I raise my arm without saying anything in advance, it then becomes simply an intention-in-action. Searle goes on to answer Wittgenstein's (1953) question: If I raise my arm, what is left over if I subtract the fact that my arm went up? His answer: intentionality, and, more specifically, intention-in-action.[6] This

4. The possibility of shifting goals causes difficulties for the formalized operationalization put forth earlier in the chapter, as Schegloff (personal communication, 1980) pointed out to me. In such a sequence, only the last goal is consummated. It has been pointed out earlier in the chapter that, in any case, the interpretation of an intention is logically indeterminate whenever a goal is not consummated. It follows that the operational analysis being proposed would successfully identify the last in a sequence of shifting intentions, but could not identify the original intention nor any earlier intention in the sequence.

5. Searle, op. cit.

6. Searle, op. cit.

distinction between prior intention and intention-in-action allows us to clarify the sensorimotor infant and the representational linguistically competent adult: the former is capable of intention-in-action, but not prior intention, whereas the latter is capable of both.[7] At the same time the distinction makes clear the commonality in intentional structures at different developmental levels: from infancy through adulthood human beings manifest behavior directed toward the fulfillment of specific conditions of satisfaction. Unlike the notion of *conscious* intention, that of *prior* intention is susceptible to operationalization, through the indices of 1. overt representation and 2. the timing of such representation before action takes place. This is not to say that prior intention cannot be internally represented, but only that the potential for external representation renders it observable upon at least certain occasions. Yet Searle's notion of prior intention seems to capture much of what we understand, in everyday usage, by conscious intention.

Our study of adult-initiated offers provides many interesting examples of sensitive interfacing between a prior communicative intention expressed linguistically (representation) by an adult and intention-in-action manifested enactively (presentation) by a young child. Take, for example, the offer transcribed in table 1. The mother initially represents her offer overtly by means of the linguistic form: "(Do ya) wanna comb the baby's hair?" This sentence linguistically represents both intentional components of a speech act identified by Searle (1979): the illocutionary force—here, the intention to offer, marked by "(Do ya) wanna"—and the propositional content or intentional object—here, combing the baby's hair. The mother proceeds to carry out an intention-in-action by holding out the doll (2.24.00), presenting the comb (2.24.66), and showing Alice how to comb hair (2.26.12). This intention-in-action is thus part of and subordinated to the linguistically expressed prior intention ["(Do ya) wanna comb the baby's hair?"] Alice, for her part, acknowledges the offer (Ib) in action by taking the doll (2.29.93). Her mother's act of giving her the comb (IIa Ia' at 2.30.51) indicates her interpretation of taking the doll as signifying Alice's intention to comb the doll's hair. Alice confirms this interpretation by taking further steps in the same direction at Ib' (2.30.70) and IIb' (2.31.20), where she reaches toward and grasps the comb. Finally, at IIb she combs the doll's hair (2.31.90). The point here is that the mother expresses a prior intention which, because it is a communicative intention, involves a complementary intention on the part of the listener in order to be realized. Alice

7. Olson (personal communication, 1980) responded to this section by noting that the tide or a thermostat also fulfill the basic conditions for intention-in-action. This seems true for the simplest intentions-in-action typical of early infancy. However, extended sequences of action later in the sensorimotor period, especially when they involve substitution of alternative means in the face of barriers, manifest intention-in-action that goes beyond the capacities of waves or thermostats, limited as they are to a single, direct means of action.

TABLE 1

Living Room — Toybox legend (upper left):
⊂ ⊃ / A L

min	sec	frac	LILA (L) Mother non-verbal	LILA (L) Mother verbal	Mother eye gaze	ALICE (A) Child eye gaze	Child verbal	Child non-verbal	
2	21	56	seated, holding doll		< A	∇		seated	
	22	58	reaches into box counter-clockwise turn,		>↓ box	>↓ doll			
		90							
	23	23		(Do ya) wanna comb the baby's hair?/					Ia
		46				>L's hand		stands up, holding hat	
		90	clockwise turn holding out doll		< A				
2	24	00				> (comb)			
		66	arm in box, pulls out comb	Here's a co:mb/				smiles	
		90							
	25	26			∇ comb				
		50	smiling, combs doll's hair			>↓L			
	26	12							
		61		A::h(m)/					
	27	43			<↓A	>↓		arm extended, steps toward L: A ⊂ ⊃ L	
		73							
		93							
	28	70	reaches up, combs A's hair						
		73		Comb A:lice's hair/				leans forward	
		88						toward doll	
2	29	93						takes doll, drops hat	Ib
	30	06							
		16	sits up holds out comb						
		51						reaches toward comb	IIa / Ia'
		70	extends hand closer to A						IIa / Ib'
		90							IIa / IIa'
	31	15		(Here) comb Mommy's hair?		>↓ doll		grasps comb	IIa / IIb'
		20							
		40	drops hand					combs doll's hair	IIb
		80							
		88							
		90							

The end of an utterance is represented by an oblique (/). The length of an utterance is depicted by a column of vertical obliques to the right of the time code. Contextual notes are enclosed in double parentheses; uncertain transcriptions in single parentheses. Underlining indicates increased loudness. Overlap is indicated by brackets ([]). Colons (::) indicate syllable lengthening. A lexical item that is cut-off before completion is indicated by an upper-case dash, e.g., *wha'*. When the termination of one utterance or word is nearly simultaneous with the beginning of the next utterance or word, this rapid offset/onset or latching is indicated as follows, *In!=/=Out!/*. Pauses are specified in seconds and tenths of seconds, e.g., (1.7), while pauses of undetermined length are indicated as follows, (.). Brackets indicate duration of mothers' utterances. The direction of eye gaze is represented vis-a-vis the TV monitor screen horizontally as follows: >, facing right; <, facing left; △, facing away from the camera; ∇, facing toward the camera. Eye gaze direction on a vertical axis is represented in this way: ↑, up; ↓, down. Body orientation, in the upper left hand corner of the transcript, is schematized as follows: ⊂, body facing to the right; ⊃, body facing to the left, and so on. The offer constituents Ia, Ib, etc., are also entered to the right of the transcript.

responds with a complementary intention but it is an intention-in-action, there being no indication in her overt behavior of any symbolic representation of a prior intention. Searle's distinction brings into clear relief the intentional quality of each participant's role, while highlighting developmental differences in form.

Displaying Directionality and Conditions of Satisfaction through Selective Repetition

Is the negotiated process of interpretation occurring in interaction a meaningful index of intention? Or is acceptance of the other participant's interpretation of one's own intention so automatic that it provides no information at all? This question is particularly important in studying early language acquisition where the child's linguistic means to overtly reject an interpretation are limited or nonexistent. But our basic criteria of intentionality reveal instances in which the child rejects the mother's interpretation of the intended content of communication. Here is an example from *Early Words* (Greenfield, Bruner, and May, 1972), a film made to illustrate phenomena in the late one-word period. The child in the film is Matthew (my son) at twenty-two months of age:

> Matthew is stringing Playskool wooden beads. The beads are different shapes, but the same basic size. He says "Big" as he threads one on the tip of the string. I ask "Is that a big bead?" and he repeats "Big," adding a second bead to the tip. I say "What's big? Oh, you want to put two beads on, is that big?" and he responds, "Yeah."

Here we see what Bruner calls "sustained direction of behavior" in the form of repetition. Termination of the communication does not occur until a specific interpretation occurs: that two beads make his construction big. This example is interesting because Matthew seems to be making a very subtle discrimination between two possible meanings of the word "big."[8] The initial misinterpretation as big bead elicits a repetition of "big"; the repetition in turn becomes evidence of sustained directionality.[9] Thus, this example also illustrates the point made earlier that intentional strucure is most visible where the intended consequences do not immediately occur.

8. G. W. Shugar, University of Warsaw (personal communication, 1977) suggested that we could get a fuller idea of the structure of adult-child communication were we to record what happens after the adult's interpretive expansion; this idea is exploited in the present analysis to reveal the intentional structure of such communication.

9. Schegloff (personal communication, 1980) points out that the repetition may also have the additional purpose of correction and that this addition might be operationally revealed through intonation changes.

Another point about the example is the presence of explicit confirmation of the "conditions of satisfaction" by the word "yeah," a topic to which I shall return later.

The question can arise, as always, as to whether Matthew changes his intended message in midstream. Although always possible, as mentioned earlier, it seems unlikely with this particular example because the interpretation finally accepted by Matthew also agrees more closely with the state of affairs in the referential situation than the earlier one which he rejected. That is, the beads were all basically the same size, but he did in fact make a two-bead tower. Indeed, *big* turned out to mark a prior intention on Matthew's part. After saying the word, he proceeded to add the second bead.

The logic of prior intention means that its identification depends on knowing what happens *after* the intention is expressed. This runs counter to the behavioral and experimental tradition in psychology, according to which it is customary to understand behavior in terms of what has *preceded*, rather than followed it. It is important to make this difference clear. Otherwise adherence to the old paradigm will constitute an unacknowledged barrier to the systematic study of intention in psychology.

The preceding example also shows that conversation with the child about how to interpret what he has said can make a very specific semantic intention visible. It becomes clear that the potential for extremely subtle semantic intentions are present even in the one-word period of language development. An important methodological point is that we are talking not just about repetition but about repetition in a conversational context. The candidate interpretation which Matthew does not accept, made by the other participant, gives important evidence as the exact nature of his intention.

This use of repetition shows developmental continuity. Keenan (1975) has documented the same use of repetition to gain acknowledgment of specific word combinations in slightly older children. Adults use repetition with young children in exactly the same way. Indeed, in our study of adult-initiated offer sequences, there were many instances in which repetition provided evidence of an adult's communicative intention vis-à-vis the child. As with the child, what was surprising was that adult caregivers set about actualizing rather specific intents, especially considering the immaturity of their interlocutors. Consider the example shown in table 2.

Note that the child emits a number of behaviors including looking at his mother, but the mother continues to repeat the offer (for example "Wanna do it?" at 31.2.31 seconds). In the language of conversational analysis, this transcript allows us to look at candidate acknowledgments, ones which the mother does not interpret as such (Schegloff, personal communication, 1979). The child never does do anything specifically relevant to patty-cake and the mother never goes beyond offer presentation by proceeding to the next step of an offer realization. Finally the child crawls away. This example establishes the directionality of the mother's behavior by the repetition

TABLE 2

Legend: L ⊂ , ⊃ J

	Family Room	LIZ (L) Mother			JEREMY (J) Child		
min sec frac	non-verbal	verbal	eye gaze	eye gaze	verbal	non-verbal	
30 49 30	seated on floor		∇↓J	△, >		holding toy to mouth seated on floor leaning on right hand	
50 03				△			
51 38 96	leans toward Jeremy	Je:remy	>↓				
52 30 35	leans closer and closer to Jeremy	You wanna play patty-cake with Mo:mmy?/		<↑		Ia	
83							
53 90	sits up	Wan play pa: ((high pitched)) ti:-cake?/				toy in mouth	
54 68				>		clockwise turn, leans right: ⊂ J drops toy	
55 16 83		((singing)) Patty-cake, patty cake/		> Lillian > ↓ toy		sits up, toy in hand: ∪ J	
56 13 28 70						puts toy into mouth	
58 20							
59 48							
31 00 11 60							
31 1 10		Wanna do it?/		△↑ Liz < ↓ toy ring		begins to drop toy	
2 31							
3 00 30		Do you wanna play with Mo:mmy?/				toy drops into ring picks up toy	
03 46				△		toy into mouth turns right: ⊂ J	
4 71 18 43	claps hands on Mo:mmy	Je:remy!/					
5 33 81 53	claps ((see arrows))	((singing)) ↓ Pa:tty:					
6 18	claps	↓ Cake				crawls away→	
7 71 86	claps	↓ pa:tty					
8 20 48	sits up claps	↓ cake/					
31 91 93	hands to lap						

of her offer. But the assessment of conditions of satisfaction is indeterminate. Repetition of the offer stopped when the child crawled away, but surely one would not want to claim that conditions of satisfaction were met. Logically, the existence of a specific intention is indeterminate: the goal or object of intention is known, having been explicitly represented in the form of a prior intention ("You wanna play patty-cake with Mommy?") and yet termination occurs in the absence of the goal. $G \rightarrow T$ does *not* apply because the goal has not been achieved. That is, it is not false as $G \rightarrow T$ does *not* imply $T \rightarrow G$, but rather implies the possibility that conditions other than G produce T. Because $G \rightarrow T$ is a necessary condition to infer the presence of an intention, this situation ($\sim G \wedge T$) leaves the presence of an intention up-in-the-air, logically indeterminate. This corresponds to my sense of a phenomenon in person perception: if a person expresses an intention and you observe that person carrying out directed behavior relevant to the goal, but the person never attains the goal, you are left wondering whether the expressed intention was a sincere and genuine one.

Empirically, the interactive interpretation of intention can be useful in providing more information in the absence of the successful achievement of an intention. In the example under discussion, absence of an offer realization or nullification by the mother indicates that she did not interpret the child as having had the intention to acknowledge this specific offer. Still, logically definitive evidence concerning the mother's intention is lacking. It could be argued that where prior intent has been overtly represented, goal attainment is not a necessary condition to infer the presence of an intention, that in such cases the representation of the intention plus the directed behavior are sufficient. This seems possible if one does not worry about hypocrisy, that is, if the representation of an intention is taken at face value. The stiffer criterion, including $G \rightarrow T$, in contrast, eliminates from the class of intentions cases where people verbally express an intention but do not carry it through.

The mother's repetitions of the offer in this example also illustrate a characteristic of intentional linguistic communication that is rare in the very young children with whom the caregivers were interacting: that is, what Bruner (1974) calls substitution of alternative means to correct for deviation. Thus, in table 1 each repetition of verbal offer involves a slight variation on the original theme, 'You wanna play patty-cake with Mommy?' Alternative means are even broader than these verbal repetitions: this mother, for example, uses the child's name as an attention-getting device and demonstrates the activity being offered (the intentional object in Searle's terminology) by clapping her hands. Indeed, our results showed that unless the mother's alternative means were relevant to getting the child's visual attention on the offer or to presenting it nonverbally, that is, on a sensorimotor level, linguistic repetition and variation did not succeed in actualizing the mother's intention to communicate an offer by eliciting an acknowledgment any more than did the original presentation.

When we are talking about intention-in-action, rather than prior intention, is there not a certain degree of circularity in our operationalization? The problem is this: conditions of satisfaction G are part of and identified by the intention in question. Yet without evidence of a prior intention, there seems to be no way of identifying the goal, independent of its termination of behavior. In such cases, one way of breaking this circularity is through behavioral confirmation of the goal attainment in subsequent interaction: for instance, Matthew's "yeah" in the example just presented. It need not, however, be linguistic confirmation. My informal observations suggest that, under appropriate circumstances, relaxation and smiling might, for example, serve as behavioral indices that an intention has been realized.

Children Begin to Use Linguistic Means to Accept or Reject Adult Interpretations of their Communicative Intent

The next example of communicative intentions illustrates the use of "no" and "yeah" to explicitly confirm or disconfirm the mother's interpretation of the child's communicative intent. The example (from Matthew, age nineteen months twenty-one days) also reveals once again how communicative intentions become more visible when they are not immediately realized. This example also shows how an adult repeats the child's utterance as a communication check, while the child repeats his until it is basically understood; these two phenomena were noted by Keenan (1975).

[Matthew's sister Lauren had gone out of the room.]
MATTHEW: Lara [Lauren].
MOTHER: Yeah, Lauren. What happened to Lauren?
MATTHEW: Oh [or ou, two transcribers disagreed].
MOTHER: Oh?
MATTHEW: No.
MOTHER: Hoe?
MATTHEW: Ou.
MOTHER: Out?[10]
MATTHEW: Yeah. Yaya [Lauren].

Keenan (1975) reports examples of *yeah* used to confirm an adult interpretation at two years nine days. Our data indicate that the earliest use of *no* and *yeah* in response to adult communication checks occur for Matthew during the observation session at seventeen months thirteen days, much earlier than one might think. Nonetheless, repetition and its termination appears at the very onset of language as signs of intentionality in children's speech.

10. Schegloff (personal communication, 1980) points out the importance of a list of candidate goals in the mother's mind to the process of inferring the child's intention in this type of sequence.

In addition, the foregoing example makes it clear that the child's intent encompasses more than getting the attention of his mother; he also wants to get a specific message across. Indeed, his addition of *Yaya* at the end of the discourse appears to indicate an awareness that the original topic, Lauren, may have been lost in the discussion that subsequently ensured concerning his comment.

Although both mother and child, therefore, give strong indications that communication is in the attempt to share intention, their roles in the management of the process are somewhat different. In these cases, the mother is the one who takes responsibility for the achievement. If the mother expresses an intention through an utterance or action A, and if acknowledgment of that intention fails to occur, she tries to communicate that intention to the child via alternative expressions or actions A', A", and so on. On the other hand, if the child expresses intention via A and similar acknowledgment fails to occur, he just repeats A and the adult varies the interpretation until she hits an expression which the child takes to be appropriate to that intention. Thus with young children the adult carries the major role in managing the sharing of intentions, a point nicely shown in the papers of Kaye and Charney, and of Brown in this volume.

Expectation or Intention?

At this point the reader may ask, is it really necessary to use such a sloppy term as "intention"? What about "expectation"?—it has future reference, as well as an honorable history in psychology. This is my reply: Speakers do not merely *expect* certain results in their hearers; they actively work to *cause* them, and this becomes overt when the effect is question is not immediately produced. Searle, in his recent analysis of intentionality (1979), sees the causal component as crucial in setting intention apart from other mental states, among which expectation would presumably be included. According to Searle, an intention is satisfied when it causes its intentional object. For example, the intention to kill someone (the intentional object) is satisfied when you poison him; the expectation that he will die may also be fulfilled at the same time. However, the intention to kill someone is not fulfilled when the person dies in his sleep from a heart attack. Thus, intention may often include expectation, but expectation does not have all the qualities of intention. Keenan, a pioneer in the application of conversational analysis to the conversations of very young children, adopts the notion of speaker expectation as central. I would like to argue that she is really talking about intention. Consider, for example, the following instance of dialogue between a pair of twins, age two years, nine months (Keenan, 1974) in which a comment is repeated until what she terms the expected acknowledgment occurs:

Twin A: e e moth moth/ .
Twin B: goosey goosey gander/ where shall I wander/
Twin A: e e moth moth moth moth/
Twin B: up downstairs lady's chamber/
Twin A: e e moth moth moth/
Twin B: e e le moth/ .

Expectation seems inadequate to explain what the speaker trying to get *moth* across does. His repetition constitutes an active attempt to have his message acknowledged. Expectation would seem more appropriate if he merely waited for an acknowledgment after the first try. (It is only fair to say that Keenan gives communicative intent a central role in general, although it does not come into her analysis of specific data. The foregoing comments are addressed less to Keenan than to those who attempt to exclude intention completely from the vocabulary of scientific inquiry into human behavior.) Psychology used to consider the person as an exclusively passive respondent to environmental stimuli; the last twenty years have witnessed a profound change in this conception. A preference for "expectation" rather than "intention" under all circumstances reflects this old view of the person as passive and needs to be rejected with it.

Repairs as Evidence for Intentional Structure

A repair as defined in conversational analysis serves to clarify mishearings and misunderstandings, or more generally, fix any trouble source in conversation (Schegloff, Jefferson, and Sacks, 1977). Reilly has studied children's repairs, both spontaneous (self-initiated) and those initiated by an interlocutor (for example by "huh?"),[11] while Käysermann has studied the latter.[12] Both investigators have noticed that the second time around, the utterance becomes more refined or expanded. Jefferson (1979) has noticed this same phenomenon in adults. Here is an example of a self-initiated repair from Reilly (1978):

NOAH [3,0; playing with a train]: De udder way
　　　　　　　　　　　　See it goes the udder way

From the point of view of intention, the first utterance apparently does not meet the terminal requirements or conditions of satisfaction set by the child. Hence, the second utterance which establishes the component of directionality: movement toward greater elaboration. Reilly concludes, "Since it is the child, in these cases, who initiated the expansion, we can infer at most that he has some intention of producing the more complex or refined structure

11. Reilly, J. Children's repairs. Unpublished manuscript, 1978.
12. Käyserman, M. L. Paper was presented at the meeting of the Max-Planck-Gesellschaft Projektgruppe für Psycholinguistik, Nijmegen, The Netherlands, February, 1979.

ture, but that he needs two turns to accomplish this level of complexity. Or we can assume at least that he is unsatisfied with the first turn, and produces the second to refine his initial utterance" (p. 4). In this case, there is no evidence to infer that the intention is motivated by an intention to communicate, since the response of a hearer is not involved. A communicative intent may still be involved as the child may intend the more complex message in itself, not merely as a clarification of a first, inadequate one. This Reilly's view; she sees the division of the message into two turns as a strategy for simplifying constructions on the leading edge of the child's linguistic competence.

Other-initiated repairs have a clearer communicative intention and thus functionally resemble repetition when the first message doesn't get across. The more elaborate nature of the second turn noted both by Reilly for American children (1978) and Käyserman (1979) for Swiss children gives initiated repairs a special form of directionality going beyond the mere persistence of self-repetition. Indeed, they manifest one of the optional characteristics of intentional behavior present on Bruner's list: a substitution rule whereby alternative means can be deployed for correction of direction. Here is an example of the phenomenon from Reilly:

> JAMIE [6,3]: How an hour is long sometimes and so short another time?
> MOTHER: What, honey?
> JAMIE: How can an hour be long sometimes and so short another time?

Mother signals unsuccessful communication and Jamie constructs an alternative sentence to correct the situation.

Considering other-initiated repair as an intentional structure, one would like to know what happened *after* Jamie's second turn. Did his mother say something to show that she had understood the second version? The answer to this question is relevant to understanding Jamie's intentional object, the nature of the conditions of satisfaction for his intention. It was not, however, necessary for Reilly's purpose of examining repair as a learning strategy. This example thus illustrates how the study of intentional structures demands more information on the consequences of behavior than we, as behavioral scientists, are in the habit of collecting.

Disentangling the Intention to Communicate from a Communicative Intention

The intention to communicate is basically the intention to affect a particular audience. A communicative intention is the particular effect (illocu-

tionary and locutionary) intended.[13] Very often these cannot be operationally separated out. But it is particularly interesting when this is possible. The following example illustrates conditions where this can be done for a child at the one-word stage. This example also shows how single words can be used to signal intentions which can be realized only through extremely complex sequential interactions. (The example is an observation of a child at the one-word stage made during a children's gym class which his mother was teaching.)

> The child goes toward his mother, whining "shoes, shoes" (he has only socks on). He comes back toward me and gets his blue sandals. I try to help him while standing up, but cannot do it. So I sit down with one shoe, put him on my lap, and put his shoe on. Then I put him down, not saying anything. He walks straight to his other shoe, picks it up, and comes back to me. I put him on my lap and put his other shoe on. He then runs toward his mother still talking, saying "shoe, shoe" in an excited voice. He lifts his foot to show her. When she attends, he points to me. She understands, saying something like "The lady put your shoes on." Both are very excited.

The intention to communicate with his mother is distinct from his message, the intentional communication, because mother and shoes are in opposite spatial directions. Note his literal directionality (in space) and note he stops repeating 'shoes' after reaching his mother. His intentional communication, in contrast, is a desire to have his shoes on. This is demonstrated by the fact that he ultimately goes toward the shoes and engages in complex interaction with me in order to get them on. He is a very active participant in this process: note where he goes to the second shoe, picks it up, and brings it back to me. This complex sequence of steps would seem another way in which directionality (D) can be operationally characterized. Once his shoes are on (G), action on my lap is terminated (G→T). Now, however, he communicates 'shoe, shoe' in an excited voice. This change from whining to excitement is an interesting candidate for an observable index of goal attainment, the fulfillment of intention. While possibly marking the attainment of one goal, it also constitutes the beginning of a second communication. Again, the intention to communicate to mother is manifest in running toward her (D) and stopping when he reaches her (G→T). The communicative intention is then revealed. He lifts his foot until his mother attends. The continuation of this position exactly until drawing his moth-

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13. Cazden (1977) restricts communicative intent to illocutionary force, whereas Dore (1975) points out that "intention" has been used in he field of child language to refer to both locutionary and illocutionary aspects, in accord with my usage here. These terminological differences do not, however, affect the points under discussion.

er's attention is our only evidence of directionality; timing certainly should be useful evidence in cases where we have a video record, but we do not have one here. The termination of footlifting (only implicit in my notes) fulfills the G→T condition. This lacuna in my notes illustrates the kind of information often missing in observations because it is taken for granted. I think there is a general tendency to note onset of new behavior and take terminations for granted. The child then points to me, and his mother interprets his message. At this point, knowledge of the child's response would be needed to know if he accepts his mother's interpretation of his semantic intention. Again, my notes, taken for a different purpose, make the common error of not extending enough into the consequences of action to satisfy the complete requirements of a stringent analysis of intention. Nevertheless, this example does illustrate certain circumstances in which a group of related intentions can be disentangled through analyzing complex sequential interaction.

Conclusion

Speech act theory as developed by Searle (1969; 1975a; 1975b; 1979) makes intention intrinsic to language use. However, by leaving out the sequential course of communicative interaction, it provides little means for the operational definition required for stringent application to empirical phenomena. Conversational analysis as developed by Schegloff, Jefferson, and Sacks (for example, Schegloff and Sacks, 1973; Schegloff, Jefferson and Sacks, 1977) provides the latter, but generally prefers to talk about the functions of sentences rather than the intentions of people. I have tried to integrate these two sets of contributions in the belief that their integration will allow the issue of intentionality to be systematically and empirically investigated. Yet it is necessary to go beyond the linguistic phenomena addressed by speech act theory and conversational analysis. I hope this chapter has made it clear that our analysis is not limited to intention in linguistic interaction, but applies to nonverbal (sensorimotor) interaction, as well as interaction which uses both modes together (cf. the two transcripts of offers, tables 1 and 2). Indeed, the logic of intention and its operationalization applies to intentional action as well as interaction. Because an intention is essentially an internal cognitive state, it is only indirectly observable. One goal of this chapter was to show how, because of the mutual processes of interpretation going on in interaction, such interaction provides a context in which the intentionality of a single individual's action becomes all the more observable.

Intentionality has been with us since the beginning of psychology. Generally it has entered through the back door. My claim is that our most

mechanistic, reductionistic pieces of research would not be possible for us as human beings if we did not impose an intentional structure on behavior. If you don't believe this try to make sense of the molecular transcripts in tables 1 and 2 without the labels identifying their organization in terms of the intentional structure of an offer (Ia, Ib, and so on). We need to understand much more about our own perception of intention and the basis for the perception in the actual organization of behavior. This task requires a rigorous analysis of intentionality and consideration of complex sequences of activity. The operationalization of intention requires us to study more than the stimulus antecedents of behavior; equal attention must be paid to the forward thrust of action and its interactive consequences.

Afterword

The intellectual history of this chapter—an important piece of my own intellectual history—constitutes a true acknowledgment of the contribution Jerome Bruner has made to my development.

The history of this chapter starts in 1961 when, in my junior year at Radcliffe College, I took Jerry's graduate seminar. We read three books, each of which provided themes for my later thinking and research: Inhelder and Piaget's *Growth of Logical Thinking*, Vygotsky's *Thought and Language*, and, most important for the present chapter, *Plans and the Structure of Behavior* by Miller, Galanter, and Pribram. This last mentioned book was the first clue I had that purpose and intention, so important to my personal view of human nature, could be rigorously treated in scientific psychology.

The topic of intention came up next when I returned to the Center for Cognitive Studies as a Fellow in 1968. Jerry was working on infancy and was full of observations and ideas about early intentionality. This was the ambiance which inspired a paper called "Goal as Environmental Variable in the Development of Intelligence" (1972). The paper was originally presented at the Conference on Contributions to Intelligence organized in the wake of the furor over Jensen's (1968) article on intelligence in the *Harvard Educational Review* and held at the University of Illinois in November 1969.

The most recent impetus for this chapter came when I was invited to join a language group organized by Jerry at the Netherlands Institute for Advanced Study in Wassenaar; I spent two weeks there in February, 1979. Although intentionality was not directly discussed, reactions of the group to our research on adult-initiated offers stimulated or provided a number of the ideas in this chapter. I am grateful to Jerry Bruner, Melissa Bowerman, David Olson, and Manny Schegloff for their serious and valuable discussion

of our work. In addition to the NIAS group, the comments of Elena Lieven, who attended my NIAS seminar, were most useful and insightful.

With respect to this chapter, I owe a special debt to Emmanuel Schegloff whose comments on our film *Early Words* gave me my first glimpse into conversational analysis and how it could be applied to my own data. Although Manny and I are both at UCLA, it was through the experience at Wassenaar that we came to understand each other's work deeply enough to talk about it at a meaningful level. I am grateful to Jerry for masterminding the NIAS group and including me in it.

This chapter owes an intellectual debt to two other people in Los Angeles: to my student, Patricia Zukow through whom I gradually came to understand conversational analysis and, specifically, the methodological value of an interactive approach to the language acquisition process; and to my colleague Elinor Keenan whose work on child discourse furnished a brilliant background against which to develop my ideas on intentionality.

The final inspiration was the passage from Jerry's autobiography with which I opened. I hope this chapter contributes to filling the need identified therein: the need to give intentionality its rightful place in our scientific description of human nature.

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