

# Early Metalinguistic Competence: Speech Monitoring and Repair Behavior

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This article examines 2–3-year-olds' responses to specific (e.g., "Where did he go?") and neutral (e.g., "What?") requests for clarification. The focus is on children's ability to locate the linguistic errors that provoked neutral questions of clarification and their success in providing appropriate repair. It is argued that this behavior provides evidence for a speech monitor that detects errors and enables repair. Contrary to A. Karmiloff-Smith's (1992) claim, control over the production and comprehension of specific structures does not necessarily precede monitoring. Rather, metalinguistic abilities that are implicated in speech monitoring develop simultaneously with the acquisition of primary linguistic behavior and do not require awareness. It is claimed that such metaprocesses are fundamental to the use of language as a vehicle for the expression of intentional content.

This article focuses on young children's behavior in response to requests for clarification. Children's ability to monitor their speech and to locate the linguistic problems that provoked these requests as well as their success in providing appropriate repair are examined. Most previous work on conversational repairs has dealt with social-pragmatic aspects of this behavior with almost no attention paid to the relevance of repair behavior to the phenomenon of speech monitoring.<sup>1</sup> Yet, consider the nature of conversational repair. Earlier studies have drawn attention to the fact that there are two distinct ways in which a listener may overtly express, in language, the fact that he or she has not understood what has been said (Spilton, 1977). The listener may pose a focused question that will guide the speaker to the source of the difficulty encountered by the listener (e.g., "Where did he go?"). Following Garvey (1977), I term such a request a *specific request* (SR). In response to an SR, the speaker may attempt to repair his or her previous utterance, repeat it, or change the topic altogether. A reflection on the nature of responses to SRs suggests that answering them does not differ from answering any other question that may be asked in conversation. Because the listener's query is specific, it can be answered directly, without recourse to the previous utterance.

Alternatively, difficulties of understanding may be conveyed through the use of a nonspecific, neutral question like "What?" I term such a request a *neutral request* (NR; Garvey, 1977). Because an NR is very general and does not inform the speaker of the specific source of the difficulty, it requires the speaker to locate the problem and then do something about it, for example, repair it, repeat it, or change the topic altogether. In fact, this is very similar to the process underlying spontaneous self-repair. It is important to note, however, that the ability to locate the source of the problem

and the ability to repair once the source of the difficulty has been identified are separate empirical issues.<sup>2</sup>

The present study investigated children's reactions in response to requests for clarification, focusing on their reactions to neutral questions (NRs). My interest lies with the linguistic and metalinguistic knowledge revealed through this behavior. I argue that

<sup>1</sup> Earlier studies dealing with the communicative function of repairs discussed children's tendencies to repeat whole utterances or to modify parts of their utterances and respond differentially to different cues (Garvey, 1977; Glucksberg & Krauss, 1967; Peterson, Danner, & Flavell, 1972). Konefal and Fokes (1984) studied conversational repairs following listeners' contingent queries in 2-, 3-, and 5-year-olds. Their analysis showed that each group used different strategies to repair its utterances when not understood. Individual preferences for specific repair strategies decreased with age. Brinton, Fujiki, Loeb, and Winkler (1986) studied 2–10-year-old children in a picture description task. The experimenter requested clarification at random intervals, pretending not to understand what the children had said. Children of all ages complied with the adult's requests for clarification. Tomasello, Farrar, and Dines (1984) found that young children repeated more for their mothers and less for strangers when presented with nonspecific requests for clarification. Tomasello, Conti-Ramsden, and Ewert (1990) compared the conversations of mothers and fathers with their 15-month-old and 21-month-old children, with special attention to breakdowns in repair sequences. They found differences between mothers and fathers in their rates of requested clarifications, the types of queries they used, and the amount of acknowledgement of the children's utterances. Anselmi, Tomasello, and Acunzo (1986) suggested that very young children can comprehend the linguistic structure of specific queries and make pragmatically appropriate responses. Shatz and O'Reilly (1990) argued for a pragmatic approach to the analysis of repairs. Their results suggested that young children are motivated to repair their utterances when they have not achieved a desired behavioral response from others. Shatz and O'Reilly suggested that young children's competence in responding to requests for clarification may reflect their desire to achieve goals through the direction of others rather than show their sensitivity to the fact that their messages must be understood by the listeners.

<sup>2</sup> The most dramatic data that speak to the separability of error detection from error correction come from studies of agrammatic aphasics who could identify errors that they were unable to correct (Goodglass, Gleason, Bernholtz, & Hyde, 1972; Kolk, 1978; Linebarger, Schwarz, & Saffran, 1983).

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children's ability to monitor their speech and to locate errors in their own production provides evidence for metaprocedures that are fundamental to the use of language as a vehicle for the expression of intentional content. Such metalinguistic abilities develop simultaneously with the acquisition of primary linguistic behavior. Children's failure to repair many of the errors that they located following neutral questions as well as their failure to repair in about half of the cases in which specific questions were posed suggest that despite their monitoring abilities, they still lack the specific linguistic knowledge that guarantees correct production.

My use of the notion of "error" to refer to aspects of the utterance that provoke NRs or SRs requires clarification. Whereas one can speak of errors with respect to morphological form or syntactic phenomena, where normativity is relatively straightforward, errors in linguistic aspects related to meaning are not easily defined. Throughout this article, I use the term *error* in a broad sense to refer to an identifiable linguistic aspect of the utterance that may be the cause for its infelicity.

### Previous Research

Relatively little attention has been paid within developmental studies to the phenomenon of speech monitoring in children. As for mature speakers, models of speech production in adults invariably assume that speaking involves constant monitoring. The evidence typically relates to spontaneous self-repair. Such work can nevertheless provide a potential theoretical framework within which children's responses to conversational NRs may be considered.

The most detailed model of speech production and monitoring can be found in the work of Levelt (1983, 1989; but see also De Smedt & Kempen, 1987; Laver, 1980). According to Levelt (1989), intentional speech is subserved by a system that consists of a number of partly autonomous components. The conceptualizer generates preverbal messages. These messages consist of conceptual information that is propositional and that is the means for realizing the speaker's intention. Note that the term *preverbal* may be misleading because it implies a propositional content that is independent of all language. The discussion in Levelt (1989, chap. 3), however, suggests that this is not so. Preverbal messages have thematic structure, they have perspective, and they contain language-specific features of various sorts. Furthermore, Levelt (1989) argued that using a particular language requires the speaker to think of particular conceptual features that are grammaticized in that language.

Preverbal messages are the input to the formulator. The latter consists of two subcomponents: a grammatical encoder and a phonological encoder. The grammatical encoder retrieves all lemmas from the lexicon and generates a grammatical structure that is a reflection of the conceptual relations in the message. Lemma information, associated with each lexical item, contains the meaning or sense of the word (i.e., the concept that goes with the word) as well as its syntax. The phonological encoder creates a phonetic plan that is fed to the articulator. The resulting movements of the articulator yield overt speech. In Levelt's (1989) system, speech comprehension is tightly connected to the production system. The speech system makes self-produced internal speech as well as overt speech available to the conceptual system. This allows the speaker to monitor his or her own productions. Similar to the

comprehension system, the monitor has access to both the form information and the lemma information in the lexicon in order to recognize words and to retrieve their meanings. Its output is a representation of the input speech in terms of its phonological, morphological, syntactic, and semantic composition.

The major advantage of Levelt's (1989) approach, as he stated it, is that there are no special-purpose editors to check the output of processes in which lemmas are involved, of grammatical encoding, of segmental spell-out, and so forth. Only the final (prearticulatory) phonetic plan and the overt speech can be attended to by the language-understanding (and language-monitoring) mechanism. Note, however, that Levelt (1989) described a mature system that cannot be imputed in its entirety to the developing child. For example, the degree of confidence with which a developing system is monitoring its products must be limited and varied, whereas the system hypothesized for the adult knows what the right form is. Bearing in mind such potential differences, I adopted Levelt's (1989) model as a general framework within which children's repair behavior could be considered.

The intriguing issue of the relationship between metalinguistic awareness and language performance has been discussed in several publications. Bohme and Levelt (1979) and Bohme (1983) tested children at two points in time. A significant correlation was found between a high level of explicit awareness on Test 1 and a high level of language performance on Test 2, 5 months later. No such correlation was found between performance and awareness at each testing period. C. L. Smith and Tager-Flusberg (1982) found that performance on metalinguistic tasks was significantly correlated with language measures when the effects of age were partialled out. Participants in their study were 3- and 4-year-olds. Although the findings from these three studies demonstrated early metalinguistic awareness, they did not speak to the necessity of such abilities for the actual process of language acquisition.

Clark (1978) and Clark and Andersen (1979) discussed 2-year-olds' spontaneous repairs of their own speech and argued that a developmental link exists between such repairs and verbal, metalinguistic judgments in the late preschool years. The authors argued that such early repairs require awareness of language. But is awareness a necessary requirement for repair behavior to occur? If metalinguistic awareness is defined as the conscious ability to reflect on and manipulate the structural features of language (Turner & Herriman, 1984), then explicit comments about language do indeed demonstrate awareness, whereas actual repair may be produced in the absence of such conscious elements.

Marshall and Morton (1978) expressed their reluctance to use the notion of awareness, although they were not yet ready to fully dispense with it. Instead, they proposed a distinction between *implicit* and *explicit* awareness. They suggested a developmental model in which linguistic awareness of both types is viewed as an error-detecting mechanism (which they called EMMA), operating on-line in production to detect and specify errors and introduce repair. Linguistic awareness is visualized as a hierarchy of monitoring, control, and repair processes. Marshall and Morton argued that whereas normal language production and comprehension could happen, in principle, without monitoring, typical situations of language use often require that the products of the computational system be subject to control and repair. It is the sheer complexity of linguistic programs and the conditions of appropriate use—and presumably also the crucial role of successful com-

munication as a survival factor—that require the development of fault finders and fault describers from the earliest phases of language development. In fact, EMMA is seen as part of the (internal) acquisition device. The current approach to children's repair behavior is very much in line with the analysis provided in Marshall and Morton's work.

Karmiloff-Smith (1986, 1992) argued for the separation of awareness from unconscious metaprocedures. In her view, the latter represent a fundamental aspect of the way in which normal children work on their linguistic representations after they have achieved "procedural mastery," that is, once primary linguistic performance in the relevant structures is adultlike. Thus, in Karmiloff-Smith's (1992) model, metaprocedures such as those involved in speech monitoring and repair presuppose control over production and comprehension of the specific structures involved. *Awareness*, a term reserved by Karmiloff-Smith (1992) for children's ability to comment explicitly on language, may be achieved at a later developmental phase.

Although I fully agree with Karmiloff-Smith (1986, 1992) on the need to separate metaprocedures from awareness, I suggest that a central criticism of her approach to language development concerns the requirement that, with respect to specific structures, mastery of primary behavior must be attained before metalinguistic procedures become available. The present work argues that such an acquisitional course is theoretically, as well as empirically, untenable.

Note that although the examples given in the literature on self-monitoring and metaprocedures often relate to grammatical aspects of children's utterances, none of the theoretical frameworks is restricted to only those aspects. Recall that in Levelt's (1989) system, the monitor (the status of which is similar to that of the comprehension system) has access to both the form information and the lemma information in the lexicon, which it uses to recognize words and to retrieve their meanings. Its output is a representation of the input speech in terms of its phonological, morphological, syntactic, and semantic composition. Marshall and Morton (1978) mentioned structural complexity as well as conditions of use, that is, pragmatics, as the motivation for speech monitoring. Similarly, the present work adopts a definition of language and, hence, of metalinguistic operations that is broad enough to encompass grammar as well as lexical, semantic, and pragmatic aspects of language when they are overtly expressed in language.

## The Study

### Method

*Procedure and population.* The data consisted of naturalistic adult-child conversations in which exchanges of the following type occurred: (a) The child said something, (b) the adult expressed his or her lack of understanding of what had been said through an explicit request for clarification (the request could be specific or neutral), and (c) the child responded. Only exchanges in which the adult's query could be related to some linguistic aspect of the child's utterance were analyzed. Instances in which difficulties of understanding may have been caused by external circumstances (e.g., an unexpected noise, an event that required sudden attention, or cases in which the adult did not hear what the child said) were excluded from the analysis.

The adult's difficulties in understanding were authentic, and no manip-

ulation was attempted. This naturalistic setup had two drawbacks from the point of view of the investigation. The first concerns the fact that relatively few situations arise in natural conversations with 2–3-year-olds in which adults really require clarification. As a consequence, despite the fact that large corpora have been searched, such naturally occurring requests for clarification do not abound. The second drawback concerns the fact that the only errors that children had to react to were those that the adult considered disruptive to the conversation.<sup>3</sup> Nonetheless, as usual, the naturalistic method had the advantage of genuinely reflecting the naturally occurring phenomena of requests for clarification and children's reactions to them. Table 1 gives examples of erroneous or infelicitous utterances that did not provoke the adult's requests for clarification.

Speech samples were collected from 8 normally developing boys and girls who were participating in an ongoing project on the acquisition of Hebrew. The children were from educated, middle-class families (all parents were either university graduates or students), and Hebrew was the children's first and only language at the time of data collection. Each child was recorded 3–5 times, with a maximum interval of 1 week between recordings. Children were seen in their homes, and the sessions were devoted to play and fun, often in the presence of other members of the children's families. Each session lasted about 1 hr, and the children were attentive and cooperative.

Two different experimenters, neither of them a parent, collected the data and later transcribed the audiotapes. The experimenters were unaware of the fact that repair constituted a topic of investigation. Age, mean length of utterances (MLU), and size of the analyzable corpus for each child are given in Table 2. MLU was calculated according to the system devised by Dromi and Berman (1982) and revised by Levy (1996). This system takes into account the fact that Hebrew is a richly inflected language and thus counts morphological units smaller than words.

*Coding.* Each session was coded by two separate researchers. The coded files were checked and rechecked several times by a third investigator. Disagreements in coding were settled by discussion. Exchanges for which agreement could not be reached were discarded. Child utterances were coded for all aspects of linguistic performance according to the child language data exchange system (CHILDES; MacWhinney, 1995), supplemented by a special system for coding Hebrew texts (Levy, 1996).

The coding of linguistic errors in naturalistic conversations involves complex decisions concerning childish forms of speech as well as decisions concerning colloquial versus normative standards of usage. The coding of grammatical errors is as problematic in this respect as the coding of meaning aspects because of the nonstandard usage that may be found in colloquial speech and the central role that extralinguistic context plays in the interpretation of utterances within discourse. Because the level of education of the children's parents was comparable to that of the coders, coding decisions followed the researchers' standard of colloquial use.

The following steps were involved in coding an adult-child exchange. First, a decision was made whether a request for clarification was of an NR type or an SR type. Second, the child's utterance was coded for the error it contained. Recall that in the present article, the term *error* is used in a

<sup>3</sup> In several studies, the experimenter queried the child's utterance at fixed intervals, resulting in many more requests for clarification than would occur naturally (Anselmi et al., 1986; Brinton et al., 1986; Tomasello et al., 1984). Notice that the use of such a methodology presents the child with a problem. Whereas the child's monitoring system is telling him or her that the utterance contained no error, the listener is expressing difficulties in understanding. Under such circumstances, the child is more likely to assume that the listener did not hear well rather than that there is a need to change the previous utterance. Bowey and deBhal (1994) prompted children with a general "Pardon?" whenever they heard an error, even if the meaning of the utterance could be inferred from the context. This seems like a promising way of addressing these methodological problems.

Table 1  
Examples of Child Errors That Did Not Provoke  
Adult Requests for Clarification

Syntactic errors	
Agreement error	
C: ima *horid li et ha-xulca	
mother-fem. took-off-mas.sg.3rd me DO the-shirt	
"Mother *took off my shirt"	
[The subject <i>ima</i> is a feminine noun, whereas the verb <i>*horid</i> is in the masculine.]	
R: ve-ma asu lax od?	
and-what did-mas.pl.3rd to-you-fem.sg. more?	
"and what other things did they do to you?"	
Wrong preposition	
C: yedidya hevi otanu le'exol mamtakim	
yedidya brought-mas.sg.3rd DO-pl.1st to-eat sweets	
"Yedidya brought us sweets to eat"	
[Child uses an inflected form of DO instead of the preposition <i>le</i> (to us).]	
R: ve-ze haya kef?	
"and-this was fun?"	
Morphological errors	
Wrong inflection	
C: alu *ali kan nemalim	
climbed-pl.3rd *on-1st.sg. here ants	
"Ants climbed on me here"	
[Child uses a wrong form of the inflected preposition <i>al</i> (on).]	
R: ma yesh lax al ha-xulca?	
what have you-fem.sg. on the-shirt?	
"What (do) you have on your shirt?"	
Nonce verb	
C: at roca she-*yarik ha-cipor?	
you-fem.sg. want-fem.sg. that-*verb-mas.sg. the-bird?	
"Do you want that *verb the bird?"	
[* <i>Yarik</i> is a nonce verb.]	
R: yesh gam ba-sefer cipor, roca lir'ot?	
there-is also in-the-book bird, want-fem.sg. to see?	
"There is a bird in the book too, want to see?"	
Meaning errors	
Wrong verb	
C: ani crixia *la-xelet le-xuc la-arez	
I have-fem.sg. to-go to-out to-the-country	
"I have to go abroad"	
[In Hebrew, the verb "travel" rather than the verb "go" is used to refer to "going abroad."]	
R: be-emet?	
"really?"	
Wrong use of negative	
R: az lama at oxelet et ze?	
so why you-fem.sg. eat-fem.sg. DO this?	
"So, why (do) you eat this?"	
C: ki ze lo taim li	
because this no tasty to-me	
"because it (is) not tasty"	
[The use of the negative <i>lo</i> (not) is inappropriate. Presumably the child wanted to say that she was eating something because it is tasty.]	
R: tiftexi pe gadol	
open-fem.sg. mouth big	
"Open your mouth big"	

Note. C = child; R = researcher. An asterisk denotes ungrammatical clauses, wrong forms, or nonce words; DO refers to accusative marker *et*; fem. = feminine; mas. = masculine; pl. = plural; sg. = singular.

Table 2  
Age, Mean Length of Utterances (MLU), and Number of  
Analyzable Utterances for Each Child

Child	Age	MLU (SD)	No. of analyzable utterances
1	2 years 2 months	2.75 (1.86)	1,220
2	2 years 5 months	3.26 (2.00)	702
3	2 years 5 months	2.86 (2.06)	1,204
4	2 years 6 months	2.89 (2.23)	1,176
5	3 years 4 months	4.30 (2.70)	696
6	3 years 6 months	4.14 (2.67)	641
7	3 years 7 months	4.16 (2.60)	977
8	3 years 7 months	4.29 (2.80)	1,291

broad sense to refer to linguistic aspects of the utterance that could be the cause for failure in the communication. Third, the child's response was coded. Responses to specific requests for clarification (SRs) were coded as SR+y if the child successfully repaired the utterance. Yet, the child could also ignore the adult's request (e.g., by changing the topic of the conversation), respond with an unsuccessful repair, or repeat the whole utterance. NRs could likewise be ignored or responded to with a change in the topic of the conversation. However, when the child complied with the NR, two questions arise: (a) Did the child locate the error? and (b) did the child repair it? NR+y was chosen if the child correctly identified the source of the problem. This was evident if, for example, the child attempted a change in the morphology or a substitution of the relevant lexical item. Repetition of part of the utterance that contained the error, but not the rest of the utterance, likewise indicated that the child had identified the locus of the problem. When these manipulations were successful, and appropriate repair was provided, the utterance was further coded as NR+y+s. Thus, the category NR+y subsumes correct as well as incorrect repairs.

Errors in children's productions and the corresponding requests for clarification were divided into three main categories: syntactic, morphological, and meaning. The syntactic category included errors in diverse syntactic phenomena, such as subordinate constructions, agreement, use of direct object markers, and use of prepositions and ungrammatical subject omission. The latter requires further explanation. With respect to subject omission, Hebrew is mixed. Omission of an overt subject is typically grammatical in the first and second persons in the future and past tense. It is ungrammatical in the third person and in the present tense. Subject omission is likewise ungrammatical in verbless clauses because those are typically in the present tense. However, subject omission in the third person and in the present tense may be acceptable, given certain discourse contexts (Vainikka & Levy, 1999). Consequently, errors of subject omission in the third person and in the present tense can be of two types: omissions that are ungrammatical and thus constitute a syntactic error and omissions that, had the immediate context been different, would have been acceptable. The latter cases are counted among the pragmatic errors, as explained below.

Errors coded as morphological relate to inflectional as well as derivational morphology. Hebrew, being a Semitic language, has a rich and complex morphology. All verbs and most nouns are constructed out of consonantal roots cast in different verb and noun patterns. The root consonants typically carry the core meaning of the word, and the different patterns serve to introduce meaning modulations or are basic. Nouns and verbs as well as adjectives and some prepositions bear inflectional affixes, prefixes, and infixes. The system is complex yet highly regular. The coding of morphological errors includes errors of forms involving root consonants, word patterns, or inflections.

Problems of meaning and corresponding clarification requests relate to lexical, semantic, and pragmatic aspects. The following are considered as

tapping lexical-semantic problems: errors in word choice, use of incompatible terms, and problems of reference. For example, utterances in which the child uses a negative term and immediately contradicts it by using a positive term that reverses the meaning of the statement or instances in which reference cannot be determined from what was actually said are coded as meaning problems. Errors of gender marking on animate nouns: inappropriate marking of tense, person, and number; and lack of definite markers when definiteness is required are likewise counted among the meaning errors. Note that in Hebrew, tense, number, person, and gender are morphologically marked; thus, knowledge of morphology is implicated in the linguistic encoding of these notions. These cases were coded as meaning errors whenever the focus was neither on agreement nor on problems of morphological form but on the correct marking of the semantic concept (see the first example of meaning SR in Table 3).

Meaning errors include pragmatic infelicity. These are cases in which the child's choice of words or construction was such that had the general

context been different, that same word or construction would have been appropriate. Discourse exchanges in which the child did not respond to the investigator's questions and inappropriately changed the topic and exchanges in which the child's response indicated lack of understanding of the requirements of the conversation were likewise coded as pragmatically inappropriate.

Another class of meaning problems concerns pragmatically constrained omission of sentence elements. Subject omission in Hebrew is grammatical in certain persons and tenses, as explained above, but it is also pragmatically constrained in different persons and tenses. Omission of a direct object is typically syntactically permissible, yet it is also subject to contextual constraints and thus can be pragmatically unacceptable. Discourse conditions likewise permit omission of other sentence elements, for example, verbs or main clauses. Such omissions can therefore be well formed, or they can be pragmatically inappropriate if the context is not right (see the first example of meaning NR in Table 4).

Table 3

Examples of Child Utterances, Adult Specific Requests for Clarification (SRs), and Child Responses

Syntactic SR	Morphological SR (continued)
<p>Child fails to correct: <i>Erroneous subject omission</i> C: *haya lanu had-mas.sg.3rd to-us "*we had" [This is a grammatically unacceptable subject omission.] R: ma haya? what had-mas.sg.3rd? "What (did you) have?" [SR] C: *haya lanu had-mas.sg.3rd to-us "*We had." [Child fails to provide the subject and simply repeats the sentence.] Child repairs successfully: <i>Agreement error</i> C: dani omer she-ha-tabaat *katan danny says-mas.sg. that-the-ring-fem.sg. small-mas.sg. "Danny says that the ring (is) *small" [This is an agreement error because <i>katan</i> is an adjective in the masculine, whereas <i>tabaat</i> is a noun in the feminine.] R: she-ha-tabaat ma? that-the-ring-fem.sg. what? "That the ring (is) what?" [SR] C: ktana small-fem.sg. "Small" [SR+s = child gives the correct form of the adjective.]</p>	<p>Child repairs successfully: <i>Wrong verb form</i> C: ani lo roca *lisrok oto I no want-fem.sg to *verb DO-mas.sg.3rd "I don't want to *verb him" [*<i>Lisrok</i> is a wrong verb pattern.] R: ma at lo roca? what you-fem.sg.2nd no want-fem.sg.? "What don't you want?" [SR] C: le-sarek oto to-comb DO-mas.sg.3rd "To comb him" [SR+s = child corrects the verb pattern.]</p>
Morphological SR	Meaning SR
<p>Child fails to repair: <i>Wrong verb form</i> C: ani nafalti oto I fell-sg.1st DO-mas.sg.3rd "I *fell him" [Child uses a verb in the wrong pattern.] R: at ma? you-fem.sg.2nd what? "You what?" [SR] C: nafalti oto fell-sg.1st DO-mas.sg.3rd "(I) *fell him" [Child fails to repair the verb.]</p>	<p>Child fails to provide repair: <i>Wrong gender</i> C: yuda boxa yuda(mas.) cries-fem.sg. "Yuda is crying" [<i>Yuda</i> is a name of a man and it requires a verb in masculine form.] R: ma hu ose? what he does-mas.sg.? "What's he doing?" [SR] C: boi nelex come-fem.sg. go-1st.pl.fut. "Come, let's go" [Child does not respond to the SR and changes the topic.] Child repairs successfully: <i>Opaque reference</i> C: ve-ani nora roca oto and-I very much want-fem.sg. DO-mas.sg. "And I want him very much" ["<i>oto</i>- DO-mas.sg.3rd" is not fully specified for reference.] R: et mi? DO who? "Whom?" [SR] C: et eran DO Eran "Eran" [SR+s = child gives exact reference.]</p>

Note. C = child; R = researcher. An asterisk denotes ungrammatical clauses or nonce words; DO refers to accusative marker *et*; SR+s refers to specific request for clarification plus successful repair; fem. = feminine; mas. = masculine; pl. = plural; sg. = singular; fut. = future.

Table 4

*Examples of Child Utterances, Adult Neutral Requests for Clarification (NRs), and Child Responses*

Syntactic NR	Morphological NR (continued)
<p>Child fails to locate the problem: <i>Erroneous subject omission</i> C: *zorek kadur *throws-mas.sg. ball [Zorek is in the present tense. Subject omission is therefore ungrammatical.] R: ma? "what?" [NR] C: *zorek kadur, lo balon. **throws-mas.sg. ball, not balloon" [Child fails to insert a subject. Instead, she elaborates on her utterance, still repeating the syntactic error.]</p> <p>Child locates the problem but fails to repair: <i>Missing preposition</i> C: *gam ani hitxapasti leisan also I dressed up-sg.1st clown **I too dressed up clown" [Child omits the prepositional prefix in front of <i>leisan</i> (clown).] R: ma? "what?" [NR] C: leisan "clown" [NR+y = child repeats <i>leisan</i> (clown) but without the obligatory prepositional prefix <i>le-</i>.] Child repairs successfully (NR+y+s): <i>Erroneous subject omission</i> C: *mexaba ta'or shela turn off-fem.sg. the-light poss.-fem.sg. "Turns off her light" [Subject omission in the present tense is ungrammatical.] R: ma? "what?" [NR] C: ima mexaba mother turn off-fem.sg. "Mother turns off" [NR+y+s = child adds the subject.]</p>	<p>Child repairs successfully (NR+y+s): <i>Wrong inflection</i> C: tistakli aleha, *yoshev look-sg.1st on-fem.sg. sit-mas.sg. "Look at her, (he is) *sitting" [Child uses a masculine verb to refer to her doll.] R: ma? "what?" [NR] C: yoshevet sit-fem.sg. "(She is) sitting" [NR+s+y = child corrects the gender of the verb.]</p>
Morphological NR	Meaning NR
<p>Child does not locate the problem: <i>Wrong verb form</i> C: *fati ba-ambatya *verb-sg.1st in-the-bathtub "(I) *verb in the bathtub" [*Fati is a wrong verb form.] R: ma? "what?" [NR] C: me-ha-ambatya from-the bathtub "Out of the bathtub" [Child fails to locate the error. Instead, she changes the preposition.] Child locates the error but fails to repair (NR+y): <i>Wrong form of adverb</i> C: yesh li garbayim *kom yael have me socks *like yael "I have socks *like Yael" [Child uses a wrong form of the adverb.] R: ma? "what?" [NR] C: *kom yael **like Yael" [NR+y = repetition suggests that the child locates the error but fails to repair.]</p>	<p>Child fails to locate the problem: <i>Direct object missing</i> C: ve-ima ve-aba yiknu lanu and-mom and-dad will-buy-pl.3rd to-us "And mom and dad will buy us" [Omission of the direct object of the verb <i>yiknu</i> results in a grammatical, yet referentially opaque, sentence.] R: ma? "what?" [NR] C: hem yiknu they will buy-pl.3rd "They will buy" [Child does not locate the source of the problem.] Child locates the problem but fails to repair (NR+y): <i>Opaque reference</i> C: ki ani osa kaxa because I do-fem.sg.pres. like that "Because I do (it) like that" [Child does not specify what <i>kaxa</i> (like that) means.] R: ma? "what?" [NR] C: kaxa "Like that" [NR+y = repetition suggests that the child locates the problem, yet she fails to repair.] R: ma? "what?" [NR] C: tasimi le-eliya naalayim put on-fem.sg.2nd to-Eliya shoes "Put on Eliya's shoes" [Eliya is the child's baby brother. In response to the experimenter's repeated query, she changes the topic altogether.] Child successfully repairs (NR+y+s): <i>Wrong lexical item</i> C: *lo yesh lax adom? no have to-you-fem.sg. red ***(You) do not have (a) red (one)?" [Child uses the erroneous combination *<i>lo yesh</i> instead of the semantically equivalent <i>ein</i>.] R: ma? amart? what said-fem.sg.2nd "What did you say?" [NR] C: ein have-neg. "Don't have" [NR+y+s = this an error of word choice that the child repairs.]</p>

Note. C = child; R = researcher. An asterisk denotes ungrammatical clauses, wrong forms, or nonce words; NR+y refers to neutral request for clarification plus located problem, and s refers to successful repair; fem. = feminine; mas. = masculine; neg = negative; pl. = plural; poss. = possessive; pres. = present; sg. = singular.

Table 3 gives examples of child utterances, adult SRs, and child responses. The table is organized according to the different error categories: syntactic, morphological, and meaning. In each category, there are examples of SRs ignored by the child and examples of SRs followed by appropriate repair.

Table 4 gives examples of child utterances, adult NRs, and child responses. Here, too, the table is organized according to the major error categories. There are examples of NRs that the child ignored; NRs to which the child did not provide repair, although he or she located the problem; and NRs followed by successful repair.

In summary, the data were coded with respect to the following: type of request for clarification (SR or NR) and the nature of the linguistic error to which it was related. If no aspect of the child's utterance was inappropriate or erroneous, it was assumed that the request for clarification was due to some nonlinguistic reason and, therefore, that it was irrelevant to the present analysis. Such cases, however, were quite rare. Child compliance with the requests for clarification was coded next. Successful repair following an SR was coded as SR+s. The child's reaction to an NR indicated whether the error was located (NR+y) and whether the appropriate repair was provided (NR+y+s).

Children's errors and corresponding requests for clarification were divided into three main categories: syntactic, morphological, and meaning. Note that although interesting insights may be gained from consideration of children's errors and adult queries as they divide between these categories, the focus of the present study was the totality of children's responses and did not depend on any specific category of errors. What was crucial for the investigation, however, was that there was an identifiable linguistic problem in the child's utterance that one might reasonably assume was the cause for the adult's request for clarification.

Between-coders agreement with respect to adult requests for clarification relating to children's infelicitous utterances was .96. Between-coders agreement with respect to errors of morphology, syntax, and meaning was .97, .94, and .92, respectively. Only utterances for which full agreement had been reached were included in the final analyses.

## Results

Findings are presented individually for each child. Given the number of children in the study and the size of the corpora, reports of statistical significance are necessarily of limited validity. The focus is, therefore, on the size and direction of the correlations rather than on absolute levels of significance. Table 5 presents the overall distribution of error types produced by the children in their spontaneous speech. Percentages refer to the number of utterances with errors out of the total analyzable corpus for each child

**Table 5**  
*Percentages of Utterances With Errors for Each Child*

Child	No. of analyzable utterances	Errors of morphology (%)	Errors of syntax (%)	Errors of meaning (%)
1	1,220	7.2	9.0	20.0
2	702	5.2	4.8	23.5
3	1,204	2.5	6.3	23.3
4	1,176	4.7	9.4	17.2
5	696	4.1	14.1	26.3
6	641	3.2	11.3	24.6
7	977	2.5	8.4	21.0
8	1,291	2.0	13.1	30.9

*Note.* Percentages are calculated out of the total number of analyzable utterances for each child.

(excluding imitations, repetitions, incomprehensible utterances, and utterances for which no agreement had been reached among the coders).

Table 6 presents the percentages of SRs and NRs posed to each child, calculated out of the total number of errors committed by the child in the relevant category. Clearly, many, indeed most, of the errors committed by the children did not provoke requests for clarification. In other words, in most cases, the adult did not bother to request clarification, presumably because there was no real difficulty in understanding what the children said or because the adult chose not to interrupt the conversation.

Table 7 gives Spearman correlations between (a) age of the children and error types, (b) MLU and error types, (c) age and requests for clarification (SR+NR), (d) MLU and requests for clarification (SR+NR), (e) age and NRs, and (f) MLU and NRs.

Intuitively, my expectation was that errors in production would decrease with age and development. Consequently, it was predicted that negative correlations would hold between age and MLU and the various error types. The correlations reported in Table 7 did not fully corroborate this intuitive idea. Whereas errors of morphology were negatively correlated with age and MLU (although the latter did not reach significance), this was not the case for either errors of syntax or errors of meaning.<sup>4</sup> These findings are examined in the *Discussion* section of this article.

As can be seen in Table 7, NRs+SRs were negatively correlated with age ( $p < .05$ , two-tailed). With respect to MLU, there was a significant negative correlation with meaning SR+NR. Although the correlations did not reach significance for either syntactic or morphological SR+NR, both were negatively correlated with MLU. I conclude that adults pose fewer requests for clarification to older children whose MLUs are more advanced than they do to younger, less advanced children. This is so despite the fact that errors of syntax and meaning do not decrease with age and MLU. In other words, despite error rates, the language of older children whose MLUs are higher poses fewer problems of comprehensibility than the language of younger children whose MLUs are lower.

A comparison between the number of SRs and NRs showed adults' preference for SR-type queries in 7 of the children (Fisher's Exact Test for Comparison of Proportions; comparisons were significant at the  $p < .0005$  level for Child 1, 2, 4, 6, 7, and 8 and not significant for Child 5).<sup>5</sup> This finding was hardly surprising because SRs are indeed clearer and direct the child to the source of the error. However, a negative correlation between age, MLU, and number of NRs was found in all but syntactic errors, as reported in Table 7 (altogether there were very few syntactic NRs). Note that although the correlation between MLU and meaning NRs did not reach significance ( $r_s = -.70$ ,  $p < .06$ , two-tailed), it was, nevertheless, quite high and negative, as expected. In other words,

<sup>4</sup> The correlations were calculated in SPSS. The value of  $r$  given by the program for  $n = 8$  that was statistically significant was .62 and thus was slightly lower than the values given in some of the more traditional tables. For example, Gilford (1978) required  $r = .643$  for  $n = 8$  and  $p < .05$ .

<sup>5</sup> The Fisher exact test considers proportions to be independent. Because my measures were within-child utterances, they should be considered dependent. Effects were therefore likely to be stronger than actually calculated.

Table 6  
*Percentages of Specific Requests (SRs) and Neutral Requests (NRs) for Errors of Morphology, Syntax, and Meaning for Each Child*

Child	Errors of morphology	SR %	NR %	Errors of syntax	SR %	NR %	Errors of meaning	SR %	NR %
1	88	36.3	14.7	110	10.0	2.7	245	34.0	16.0
2	56	26.7	25.0	111	10.8		203	17.7	10.0
3	37	19.0	35.0	34	5.8	14.7	165	23.6	18.7
4	30	36.6	26.6	77	6.4		281	33.8	10.0
5	29	20.6	20.6	98	3.0	4.0	83	11.4	6.5
6	21	19.0	4.7	73		2.7	158	12.6	0.6
7	25	12.0		82	6.0	3.6	205	6.8	2.4
8	27	29.6		170	4.1	0.5	399	12.7	1.5

Note. Percentages of SRs and NRs are calculated relative to the number of errors committed by the child in each category.

although, in general, adults prefer to pose SRs to children, they pose relatively more NRs to younger children than to older, linguistically more advanced children. This finding is examined further in the *Discussion* section of this article.

A comparison between proportion of requests for clarification and number of errors showed that adults requested clarification for morphologically inappropriate forms relatively more often than they queried errors of meaning or errors of syntax. Thus, standardized *z* scores for Armitage *s* (Armitage Test for Linear Trends in Proportions; Armitage, 1955) were significant for 7 of the children, all except for Child 7. These findings contradict the seminal work by Brown and Hanlon (1970), who found that parents tend to question aspects of meaning in children's speech and ignore grammatical errors. This is discussed below, along with the possibility that the adult pattern of behavior in the present study was related to the specific nature of Hebrew morphology.

Table 8 presents the children's success rates in repairing different types of errors about which they had been specifically questioned. A consideration of the percentages of repair in Table 8 suggests that although 2 of the children were able to repair 60% or more of the cases, other children repaired less than 50% of their errors. Given their ages and their MLUs, it is not surprising that in many cases, repair in response to SRs was beyond the children's competence.

The focus of the present investigation was children's reactions to NRs. Before turning to this question, I first consider if children do indeed understand the conversational import of a neutral request for clarification. Specifically, do children at this age and developmental phase understand that NRs require that they attend

to the previously spoken utterance? Do they understand that an NR may indicate that there was something specific in their utterance that was responsible for the hearer's request for clarification?

The percentage of changes of topic (including no response) following NRs offers a way of estimating the children's understanding of what was required of them. Changing the topic in response to an NR is typically inappropriate (although, of course, changes of topic do occur every now and then in conversation). In contrast, repetition may be an appropriate reaction to an NR if, for example, one thinks that the listener did not hear what was said. It may also be a default behavior if the child does not know what the specific problem was. However, attending to part of the utterance, repeating it, or changing a certain aspect of it is a *prima facie* indication that the child believes there was a specific problem in the expressed utterance.

Table 9 gives the number of NRs asked of each child; the percentage of changes of topic following such requests, including cases in which the child kept silent and it was the adult who ultimately had to change the topic of the conversation; and the percentage of repetitions of whole utterances. The last row gives the percentages in which the child either repeated or changed part of the utterance or single words containing a linguistic error.

The relatively small number of changes of topic suggests that the children understood that by posing an NR, the listener requested clarification of the previous utterance. The percentage of repetitions of whole utterances was rather low as well. The percentage of part-utterance repetitions or changes was between 65 and 100. Furthermore, part-utterance repetitions or changes did not systematically concern either ends or beginnings of utterances.

Table 7  
*Spearman Correlations Between Error Types, MLU, and Age; Requests for Clarification, MLU, and Age; and Neutral Requests (NRs), MLU, and Age*

Variable	Errors			SR + NR			NR		
	Syntax	Morph	Meaning	Syntax	Morph	Meaning	Syntax	Morph	Meaning
Age	.35	-.75†	.59	-.71*	-.73*	-.88*	.14	-.89*	-.84*
MLU	.62†	-.50	.62†	-.60	-.62	-.76*	.15	-.80*	-.70

Note. MLU = mean length of utterances; SR = specific request for clarification; Morph = morphology.  
 \*  $p < .05$ , two-tailed. †  $p < .05$ , one-tailed.

Table 8  
*Number of Specific Requests for Clarification (SRs) and Percentage of Successful Repair(s) for Each Child*

Child	Syntax		Morphology		Meaning		Total	
	SR	SR+s (%)	SR	SR+s (%)	SR	SR+s (%)	SR	SR+s (%)
1	32	18.7	11	18.0	84	58.3	127	44.9
2	15	26.2	12	25.0	36	30.5	63	23.8
3	7	14.2	2	50.0	39	48.7	48	43.7
4	11	9.0	5	60.0	95	36.8	111	35.0
5	6	33.3	3	66.6	21	66.6	30	60.0
6	4				20	55.0	24	45.8
7	3		5	60.0	14	30.0	16	62.5
8	8	25.0	7	28.5	51	37.2	66	34.8

Thus, it seems that the children tended to interpret NRs as relating to some specific part of what had been said, although in many cases they failed to identify the exact problem, as seen in Table 10.

Table 10 gives percentages of children's success in locating errors following NRs, coded as NR+y, and their success in making repairs, coded as NR+y+s. The percentage of located errors (NR+y) was calculated out of the total number of NRs posed to the children in the relevant category. The percentage of successful repairs (NR+y+s) was calculated out of the total number of located errors (NR+y) in the relevant category. As already noted, adults were reluctant to pose NRs to younger children, and consequently, for some children there are cells that remain empty, while others have very few instances of the relevant type of queries.

For 5 children, the total number of errors that were correctly identified (coded as NR+y) exceeded 40% (Child 6, 7, and 8 had very few cases of NRs, as shown in Table 10, and consequently only a few cases of NR+y). In 85% of the cases in which errors were correctly located (coded as NR+y), the children either repeated or tried to change single words or specific parts of the utterance, whereas in no more than 15% of the cases were complete utterances repeated or rephrased. It is clear, however, from the proportions shown in Table 10, that the children's ability to repair (coded as NR+y+s) lagged behind their ability to locate their errors. Often they were able to actually repair only a small percentage of the errors that they located.

Were the children more successful in repairing errors that they themselves had identified (NR+y+s) than they were in repairing errors with respect to which SRs had been posed (SR+s)? A comparison between the children's success in repairing their errors

following SRs and their success in repair following instances of NR+y was inconclusive. Fisher's exact test was significant for Child 1 and 2 and nonsignificant but in the right direction for Child 3, 4, 5, and 8. For Child 6, there were not enough cases. For Child 7, the direction was reversed. Thus, it cannot be concluded that children are better able to repair errors that they themselves have located.

Can one argue that children's ability to comply with particular types of NRs requires that the children first master these specific structures in their spontaneous speech (Karmiloff-Smith, 1992)? Table 11 shows repair data with respect to specific errors. Number of NRs should be considered relative to the number of errors in each of the categories, appearing in Table 6 and repeated in Table 11. Only errors to which at least four NRs were posed appear in Table 11. As a result, data from Child 6, 7, and 8 do not appear in Table 11. Five specific errors recurred, provoking adults' requests for clarification. In all children, errors involving verb forms (coded as fw and counted among the morphological errors) attracted requests for clarification. In 4 of the children, errors of word choice (coded as wc and counted among the meaning errors) provoked a considerable number of NRs. Pragmatic infelicity (coded as prgw and counted among the meaning errors) occurred in 3 children. In 2 children, there was a relatively high incidence of pragmatically unacceptable subject omission (coded as S-dis). It was therefore presented separately from the other pragmatic errors.

As can be seen in Table 11, the children succeeded in locating a fair number of the errors. Was their performance in spontaneous speech nearly perfect in these same structures? The calculation of baseline values against which the number of errors could be evaluated was hardly possible with respect to errors of word choice

Table 9  
*Number of Neutral Requests for Clarification (NRs), Percentage of Changes of Topic (CTs), Whole-Utterance Repetitions (Reps) and Part-Utterance Repetitions (SPs)*

Variable	Child							
	1	2	3	4	5	6	7	8
NRs	55	34	49	46	22	4	8	7
CTs (%)	16.3	14.7	8.2	8.6	18.0		12.5	14.3
Reps (%)	5.4	5.8	12.0	8.6				
SPs (%)	65.4	70.5	71.4	78.2	82.0	100.0	87.5	85.7

Table 10  
*Number of Neutral Requests for Clarification (NRs), Percentage of Identified Errors, and Percentage of Successful Repairs*

Child	Syntax			Morphology			Meaning			Total		
	NR	NR+y (%)	NR+y+s (%)	NR	NR+y (%)	NR+y+s (%)	NR	NR+y (%)	NR+y+s (%)	NR	NR+y (%)	NR+y+s (%)
1	3	33.3		13	30.7	25.0	39	48.7	79.0	55	43.6	66.6
2				14	35.7	60.0	20	70.0	64.3	34	55.8	63.0
3	5	40.0	100.0	13	46.0	16.6	31	38.7	41.6	49	40.8	40.0
4				8	50.0	50.0	28	64.3	50.0	46	47.8	50.0
5	4	75.0	100.0	6	83.0	80.0	12	66.6	62.5	22	72.7	75.0
6	2	50.0		1	100.0 <sup>a</sup>		1			4	50.0	
7	3	66.6					5	60.0 <sup>a</sup>	33.3	8	62.5	20.0
8	1	100.0	100.0				6	16.6 <sup>a</sup>	100.0	7	28.6	50.0

Note. NR+y = child succeeds in locating the error; NR+y+s = child succeeds in providing repair.

<sup>a</sup>Fewer than four cases.

and pragmatic inappropriateness for obvious reasons. As for verb inflection and nonce words, both morphological errors, the speech produced by the experimenters during their conversations with the children provided base rates against which the children's error rates were compared. Errors of verb forms did not occur in the adult corpora, nor were there any nonce words produced. As for the children, Table 11 shows quite a number of nonce words for 2 of the children. Percentages of errors of verb forms calculated out of the total number of verbs (finite verbs as well as infinitives) produced by the children were between 3% and 11%. It seems unlikely that children who make close to or even above 10% errors in verb forms have achieved mastery in the relevant procedures.

### Discussion

This study investigated children's reactions in response to requests for clarification, focusing on children's ability to monitor their speech, identify errors, and attempt repair. The present work adopted a definition of language and, hence, of metalinguistic operations that was broad enough to encompass grammar as well as lexical, semantic, and pragmatic aspects of language when they were overtly expressed in language. Throughout this article, the notion of an error has been used to refer to an identifiable linguistic aspect of the utterance that may be the cause for the interlocutor's need for clarification.

*Children's errors and adults' requests for clarification.* Before turning to the findings concerning the major thesis of this study, I first consider the relationship between adults' requests for clarification and children's errors of production. As expected, requests for clarification were negatively correlated with age and MLU (although in the latter case, the only correlation that reached significance was with requests for clarification related to meaning). That is, adults addressed fewer requests for clarification to older, linguistically more advanced children than they did to younger, less advanced children. However, this reduction was not accompanied by an overall reduction in error rates in the children's spontaneous productions. Although not all of the calculated correlations reached significance, the direction was clear: Whereas age and MLU were negatively correlated with errors of morphology, a similar negative correlation was not found for errors of syntax or errors of meaning.

With respect to morphology, the reduction in error rates as a function of age and MLU corroborates previous findings that showed an early development of morphology across languages (Berman, 1985; Levy, 1997). However, the fact that other types of errors do not decrease with age and MLU raises the possibility that an across-the-board reduction in error rates is not necessarily a good measure of language development between 2 and 3 years of age. Rather, along with better knowledge of morphology, development at this age and phase may be reflected in children's growing lexicon and their ability to produce longer and syntactically more complex structures of the kind that they still may not fully control.

Still, even in the face of relatively high level of errors, older children are asked less often to clarify what they said. This suggests that the children succeed in manipulating various aspects that contribute to comprehensibility, such that communication is not disrupted and errors are disregarded. Thus, older children seem to have a better understanding of the ways in which various factors—articulatory, grammatical, lexical, and situational—interact to ensure clarity in discourse.

Support for the better comprehensibility of speech of older children comes from the fact that relatively more NRs are posed to younger children, whose MLUs are shorter, than to older, more advanced children. This is so despite the fact that, overall, adults tend to pose specific queries (SRs) to children, presumably because, being specific, such questions are easier to respond to. These findings suggest that the effects of young children's errors are such that it is more difficult for adults to formulate specific queries.

The findings suggest that adults tend to request clarification for morphologically inappropriate forms relatively more often than they question errors of meaning or of syntax. This seems contradictory to Brown and Hanlon's (1970) seminal work, in which they argued that adults tend to question aspects of meaning and ignore grammatical errors. Because Brown and Hanlon's study has been frequently quoted with regard to the role of adults' feedback in language acquisition, such a contradiction requires an explanation.

I suggest that the behavior of the adults in the present study may have been due to the complex and pervasive nature of Hebrew morphology. Because of its central role in the grammar, errors in

**Table 11**  
*Specific Errors: Percentage of Neutral Requests for Clarification (NRs), Percentage of Identified Errors, and Percentage of Successful Repairs*

Type of error	NRs (%)	NR+y (%)	NR+y+s (%)
Child 1			
Morphological			
fw	23.2	40.0	10.0
Meaning			
S-dis	20.8	60.0	50.0
prgw	25.4	35.7	60.0
wc	7.0	100.0	21.4
Child 2			
Morphological			
fw	17.2	60.0	60.0
nnc	23.0	77.7	44.4
Meaning			
wc	38.0	45.4	27.3
Child 3			
Morphological			
fw	68.4	46.0	7.7
Meaning			
S-dis	44.4	37.5	37.5
prgw	20.0	33.3	22.2
wc	21.6	50.0	
Child 4			
Morphological			
fw	50.0	80.0	40.0
nnc	39.0	55.5	11.1
Meaning			
prgw	17.7	64.2	28.6
wc	10.0	60.0	60.0
Child 5			
Morphological			
fw	66.0	83.3	66.6

*Note.* Percentages are calculated out of the total number of errors in each category. Only errors to which at least four NRs were posed are presented. fw = wrong form of verb; S-dis = pragmatically unacceptable subject omission; prgw = pragmatically inappropriate phrase or clause; wc = inappropriate lexical item; nnc = nonce word.

morphology are expected to be more disruptive to conversation in Hebrew than they are to conversation in English. Furthermore, the central role of morphology in Hebrew grammar has turned it into a hallmark of the educated native speaker. Having a correct morphology is of sociocultural importance. Therefore, it is not surprising that morphological errors in Hebrew-speaking children may provoke requests for corrections relatively more often than either errors of syntax or of meaning.

*Speech monitoring and repair behavior.* The main findings of the present study concern children's ability to detect a large proportion of the errors in their productions in response to non-specific requests for clarification. I suggest that this behavior reflects the operation of a speech monitor that can detect and repair speech errors. The need for such a monitor has been discussed by

Marshall and Morton (1978), and a schematic model for its operation was given by Levelt (1989). The findings reported here suggest that the linguistic levels of organization of children's utterances are accessible to their monitor at an early stage of language development. Assuming that monitoring is a metacognitive procedure (Kitchner, 1983), this then is evidence for very early metalinguistic abilities that develop in parallel with the child's primary linguistic behavior. The analysis further suggests that conscious awareness is not necessarily implicated in this feat.

As shown in Tables 10 and 11, locating the errors did not necessarily result in correct repair. This is not surprising, because the knowledge that an error has been committed is less specific than the knowledge required for the production of a correct form. Difficulties in producing an appropriate repair are likewise evident in the fact that no more than 30–60% of the errors that provoked SRs were repaired. Thus, the assumption that failure to repair reflects failure to detect the errors, which has been the common understanding with respect to adult behavior (Levelt, 1983), cannot be maintained in the case of young children. Furthermore, contrary to Karmiloff-Smith (1992), the findings reported here suggest that the ability to monitor and locate errors does not always require primary linguistic behavior with respect to the specific systems involved.

Is it possible to reconcile the view expressed in the present work with the examples given by Karmiloff-Smith (1992), in which correct performance precedes metalinguistic procedures? Note that all of Karmiloff-Smith's (1992) examples concern linguistic phenomena that reveal a U-shaped developmental curve. Similar phenomena served as the empirical basis for Bowerman's (1982) claims concerning the reorganization of the child's linguistic system. The following is an example of such a U-shaped developmental curve (Karmiloff-Smith, 1986, p. 113). Following a period in which the articles have been used correctly (i.e., *un mouchoir* to indicate both indefinite and numeral), French-speaking children go through a phase in which they attempt to separate the various functions conflated in the French articles. Children continue to correctly use the indefinite article to imply nonspecific reference (e.g., *un mouchoir* = a handkerchief), but these same children mistakenly add a partitive when implying the numeral function of the indefinite article (e.g., *un de mouchoir* = one handkerchief). Correct performance is again achieved somewhat later.

A similar U-shaped development is not seen in any of the linguistic subsystems discussed in the present article. For example, there is no initial period of correct performance in the acquisition of Hebrew verbs nor in the development of grammatical gender. Rather, there is evidence of gradual development of morphological forms, with phases during which errors as well as overgeneralizations occur, until mastery is achieved (Berman, 1985; Levy, 1983). A similar situation holds for the development of subject omission. Thus, whereas certain linguistic phenomena may exhibit U-shaped developmental curves, in which metaprocedures may follow a period of correct performance, other systems do not follow such a developmental course.

The fact that U-shaped curves characterize the development of certain subsystems but not others may be a consequence of the fact that certain generalizations develop later than others. For example, it is predicted that formal, autonomous subsystems such as those found in morphology are acquired earlier, whereas the conceptual notions expressed by these paradigms may take longer to develop

(Levy, 1997). Thus, the various components that make up the notion of reference in the French articles, or causality or reciprocity expressed through the derivational patterns of Hebrew verbs, develop later than the formal verb paradigms. A U-shaped developmental curve, seemingly delaying metaprocedures until after behavioral mastery has been achieved, may be the effect of the longer time course required for the development of the conceptual underpinnings of these particular systems relative to the early development of the morphology that it involves. Interestingly, the acquisition literature contains numerous anecdotal reports suggesting that Karmiloff-Smith's (1992) hypothesized developmental sequence may, in fact, be reversed. These are instances in which the child has the correct structural analysis for a given procedure, as reflected in the child's explicit comments, although he or she continues to make errors in on-line usage.<sup>6</sup>

The hypothesis that children would be better able to repair errors that they themselves had identified (NR+y) than errors that were pointed out to them through SRs did not hold for all children. It is still of interest to spell out the rationale for this hypothesis. Whereas cases of NR+y relate to errors that the child identified, indicating that the child had at least some knowledge of the relevant linguistic phenomena, SRs relate to errors that the listener chose to inquire about. Those most probably include phenomena that the child did not even have a partial understanding of. Consequently, the expectation was that a larger proportion of cases of NR+y would be repaired than SRs. Reports in the literature demonstrating young children's limited ability to benefit from direct instruction support such a prediction (McNeill, 1966; N. V. Smith, 1973). However, the findings in the present study are not conclusive.

*Alternative explanations.* Are there alternative explanations for children's repair behavior that do not implicate monitoring? For example, it might be argued that in response to a neutral request for clarification, children simply repeat the utterance and that there is a certain probability that when saying it again, the utterance will be correct. In Marshall and Morton's (1978) words, the new sequence may simply be "the recirculation of the original utterance through a system of unstable rules" (p. 236). It may be that partial repetitions center around ends or beginnings of utterances and have nothing to do with speech monitoring and error detection. Alternatively, one may argue that in response to neutral requests for clarification, children reconstruct their utterances primarily on the basis of content words.

All of the aforementioned explanations fail to account for the pattern of responses seen in these data. The relatively few changes of topic in response to NRs suggest that the children understood the conversational import of these nonspecific requests. Furthermore, in 65–100% of the cases, the children tended to repeat or change parts of the utterance or even single words that contained an error. Such changes or repetitions did not focus on either ends or beginnings of utterances. This suggests that the children tended to interpret NRs as relating to the part containing the error. Repetitions or changes did not focus on content words but often concerned formal properties of the utterances, which were directly related to the specifics of what had been produced. Such behavior is consistent with the work of a speech monitor that locates errors and attempts repair.

*The intrinsic duality of intentional language.* In conclusion, I suggest that children's early metalinguistic abilities are tightly

connected to the intrinsic duality inherent in linguistic acts. Although it is probably not the case that grammar can be conceived of in abstraction of all content, utterances that people produce manifest a linguistic competence that does not require understanding of the proposition expressed by it. Thus, on one level of analysis, structured utterances are an instantiation of primary linguistic knowledge. In this sense, speaking is analogous to problem solving or to movement in space. However, utterances are simultaneously an expression of an intentional content, that is, they are about something. Besides being a primary-level cognitive act, utterances are a symbolic expression of a content that carries (at least part of) the speaker's intention (Austin, 1962/1986; Geach & Kenny, 1971; Levelt, 1989; Searle, 1983). That this expression of content is not the same as the primary act of speaking can be seen from the fact that any given intentional content could, in principle, be expressed in a nonlinguistic representational system, for example, in logical form or through a spatial modality. Note that this view does not imply that propositional content can be conceived of independently of all language.<sup>7</sup>

Given this inherent duality, the use of meaningful language necessarily engages the speaker, child as well as adult, in performance that is simultaneously a primary linguistic act and a secondary symbolic one. The data have shown that these representational levels are accessible to the young child, enabling the metaoperations that are involved in speech monitoring and repair behavior.

<sup>6</sup> The following are examples of a reversed U curve. Slobin (1978) described an exchange between himself and his daughter Heida:

Heida: She readed the book, you know, that green book.  
 Dan: M-hm.  
 Heida: That's the book she read. She read the whole book.  
 Dan: That's the book she readed, huh?  
 Heida: Yea . . . read! [annoyed]  
 Dan: Barbara readed you Babar?  
 Heida: She readed all the rest.  
 Dan: That's right. I readed the beginning to you.  
 Heida: Readed? [annoyed and surprised] Read! Will you stop that Papa?

It seems that Heida correctly rejected *readed* as the past tense of *read*, although when she spoke she frequently used this form. N. V. Smith (1973) reported the following exchange with his son, age 2 years 6 months:

Father: Say *jump*.  
 Child: *Dup*.  
 Father: No, *jump*.  
 Child: *Dup*.  
 Father: No, *jummp*.  
 Child: Only daddy can say *dup*.

In this case, too, the child monitored his production as well as his father's and noticed the differences, yet he could not produce them in his speech.

<sup>7</sup> Searle (1983) discussed the relationship between intention to communicate and intention to represent and argued that one can intend to represent without intending to communicate but one cannot intend to communicate without intending to represent.

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