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FORUM: A PSYCHOLINGUISTIC PERSPECTIVE ON DEVELOPMENTAL DYSPHASIA

From conceptual intention to utterance: a study of impaired language output in a child with developmental dysphasia

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ABSTRACT

This is a psycholinguistic case study of a child whose linguistic output is often unintelligible or ungrammatical, and who has been diagnosed as developmental dysphasic. It explores the conceptual intentions expressed in the child's spontaneous utterances, and her linguistic mapping of these intentions. Analysis of the scope and limits of her output reveal:

1. *a variety and complexity of conceptual intentions which exceed her ability to map these intentions linguistically;*
2. *constituent structures which are intact from a gross syntactic, semantic, and phonological (prosodic) point of view;*
3. *omissions and substitutions which affect syllables within words and words within sentences according to their place within the prosodic structure of the word or sentence, those items which occur pre-stress being most vulnerable;*
4. *lexical substitutions affecting words which are semantically and syntactically contingent on the head they modify.*

It is suggested that phonological constraints, which limit the processing of phonological detail within a rhythmic structure, and which may be affected by certain semantic factors, are responsible for the child's impaired output. These conclusions are discussed in relation to current research in the field, raising specific questions for further psycholinguistic investigation into developmental dysphasia.

Key words: developmental dysphasia, psycholinguistics.

This is a case study of the language produced by a dysphasic child. Impressionistically, the child's utterances sound like English prosodically, syntactically and

lexically, yet they abound in omissions and unintelligible sequences of syllables. This study explores the language processing behind these impressions. It looks in detail at the conceptual intentions which the child attempts to express in her utterances and the constraints on the realisation of these conceptual intentions. The goal of the study is to generate hypotheses about the nature of constraints on her mapping of conceptual intentions onto spoken output.

Developmental dysphasia[1] has been described and analysed from numerous points of view: neurological, perceptual, cognitive, and linguistic. It has been investigated in terms of neurological damage; problems in auditory perception, sequencing, and memory; and problems with the semantics, syntax and phonology of language (Wyke, 1978). Because of the boundaries between the disciplines involved, the descriptions and explanations they offer have been treated as separate and mutually exclusive. There has been little attempt to investigate interrelations between observations made by different disciplines such as psychology and linguistics, or to pursue their implications for the language processing of the dysphasic child.

In this study we assume a psycholinguistic perspective on developmental dysphasia. This means discussing and pursuing the assumption that language production and comprehension entail a complex mapping between conceptual structures on the one hand and phonological and syntactic structures on the other. In understanding or uttering a sentence, the overall conceptual intention must be construed in terms of

a. lexical semantic units, which map into phonological units consisting of a syllable or sequence of syllables which is rhythmically structured, and
b. semantic relations between the lexical semantic units, which map into a syntactically and rhythmically structured sequence of lexical units.

Psycholinguistic theory, with the help of linguistic concepts, has begun to throw light on the organisation of this complex mapping process, specifying the nature of structures at different stages of input and output. Developmental dysphasia can be considered in the context of such theory.

The question is: at what point is the dysphasic child constrained in this process of mapping from conceptual intention to phonological and syntactic structure, and vice versa? Attributing an auditory or perceptual memory problem to the child reveals nothing about the linguistic mapping which the child can or cannot do. Equally, attributing abnormal syntactic or phonological structures to the child reveals nothing about what aspect of the mapping process gives rise to the observed abnormalities. Looking at the problem psycholinguistically, on the other hand, means looking at input and output processing in terms of linguistic structures, and seeking to identify the linguistic nature of constraints on input and output processes.

The investigation would be so much the easier if we understood a good deal more about the organisation of processes normally involved in the conceptual-linguistic mapping outlined above, including the type of structural units processed and their interaction. We might then look at developmental dysphasia in terms of the relative

[1] The term "developmental dysphasia" is somewhat out of favour at the moment. We retain it as the clearest label for identifying a specific language processing impairment, whose nature is the very subject of this article. It should be emphasised that our use of the term does not imply any particular connection to the aetiology or symptoms of acquired aphasia.

preservation of or impairment to particular stages of processing. But such a model of language processing is very much in the making, based on studies of normal language production and comprehension, and of production and comprehension in acquired aphasia (eg Butterworth, 1981, 1983; Dowty, Karttunen & Zwicky, 1985). As we shall see, analysis of developmentally dysphasic language raises questions which go beyond current models of language processing, and which may contribute towards the elaboration of these models. A psycholinguistic approach to developmental dysphasia, then, is often in the position of constructing hypotheses about the nature of impairment which are premised upon particular structures of language processing, where these structures are themselves hypotheses based on patterns of impairment.

This is the background to the present case study. It begins to make a break in this circularity by tackling a single child's language output and discussing possible interpretations within a psycholinguistic approach. These are based on a detailed description of the child's utterances in terms of the conceptual intentions underlying them and the scope and limits of the language she uses in realising those conceptual intentions.

Detailed case studies are notably lacking in the developmental dysphasia literature. This is surprising, considering the role they have played in directing more systematic research into normal language development (eg the Harvard project (Brown, 1973)). It is only on the basis of such detailed studies, motivated by some general assumptions about language processing, that we can begin to narrow down the field of hypotheses to be investigated more systematically with a larger sample of children.

If we do not attempt some preliminary psycholinguistic descriptions of observed language behaviour, but rather leap directly into testable hypotheses, it is most likely that those hypotheses will be a function of the particular discipline from which they emerge and, whether confirmed or refuted, will throw little light on the nature of the child's language processing capacity.

The preliminary description provided by this study culminates in certain hypotheses and questions about the constraints on this dysphasic child's language which are to be investigated further.

METHOD

The subject

The subject, Ruth, was age 10;4 when the present study began. Throughout the period of investigation, she was attending a Language Unit attached to a London school.

Ruth was referred to a speech therapist at the age of 3;5. Since then she has been fairly continuously assessed on a wide range of indices. Routine audiological tests show Ruth's hearing to have been within normal limits from the age of referral through the period of investigation. The Reynell Developmental Language Scales (RDLS) (Reynell, 1972) have been used for regular assessment of Ruth's language. Her scoring on the verbal comprehension scale was close to, and even slightly above, normal until age 5. Measured on the amended RDLS (1978) at age 5–6, Ruth's comprehension score fell to 2.5 and then 3 standard deviations below normal. It is hard to say to what extent this deterioration reflects changes in the test or real

limitations in Ruth's comprehension. During the current research, TROG (Bishop, 1979) showed Ruth to have reached the language comprehension of a six year old. In contrast, Ruth's scores on the Reynell expressive language scale were initially off the scale altogether, and at 5–6 years reached an equilibrium at around the −3 standard deviation level. Although Ruth's comprehension is inappropriate for her age, having plateaued at a six-year-old level, it is clearly superior to her expression, which has been consistently impaired and is well below that of a six-year-old.

Apart from general criticisms of intelligence tests such as the Stanford-Binet scales (Terman & Merrill, 1937), the verbal bias in such tests makes them especially inappropriate for subjects thought to have specific language disorder. Ruth's assessment on intelligence tests should be considered with due reservations. On the Stanford-Binet, Ruth showed an eight month delay at age 4;8, and on the WISC scales (Wechsler, 1949) Ruth was measured at "low average" intelligence at age 7;6, with a score of 81 on the verbal tests and 108 on the performance tests.

Informal assessment and subjective impressions of speech therapists, teachers, and clinical psychologists have all identified Ruth as a bright subject, with apparently good comprehension of spoken language in context. At 7;3 she was diagnosed as a "classic case" of developmental (expressive) dysphasia. This was based on her apparent failure to develop normal language, in the absence of any organic or general cognitive impairment, and on the marked discrepancy between comprehension and production especially in early development.

Collection of data

The child was seen both in and out of school, in order to establish a relationship with the investigator and ensure that samples of language collected were representative. The data on which the following analysis was based were collected in 19 sessions, each lasting 1–1½ hours, spread over one year. Most of the speech was unsolicited, except insofar as the investigator generated fantasy situations to provide the context for creative language use. The conversations were audiotaped, and all utterances were transcribed immediately after the session together with the contextual detail necessary to identify semantic intentions.

Analysis of Ruth's output was based on all utterances which were interpretable. An interpretable utterance was one in which the extralinguistic context and/or the phonology were clear enough to identify the semantic intention behind the utterance and to transcribe its phonological realisation. In order to estimate the proportion of data included in the analysis, interpretable output was quantified for eight samples randomly selected at 1–2 month intervals. The unit of utterance used in calculating the proportion of interpretable data was the breath group, since this is the only consistently identifiable unit (see next section). Each sample consisted of 100 consecutive breath groups. The proportion of interpretable breath groups varied from 57% to 80% with a mean of 70.2%. A similar count was made for the one monologue Ruth produced, in which 74 out of 106 breath-groups were interpretable, again yielding a proportion of 70%. While on average 70% of Ruth's output is interpretable and could be included in analysis, it should be emphasised that this is not a measure of Ruth's general intelligibility. It may overestimate intelligibility for two reasons. First, Ruth's intelligible utterances are often broken up into a number of very short breath groups, whilst unintelligible sequences may be uttered in a single

and longer breath group, so elevating the proportion of interpretable relative to uninterpretable breath groups. (Though we do not pursue this observation, it has interesting implications which surely invite further exploration.) Secondly, general intelligibility is affected by factors beyond the scope of the breath group, such as the interpretability of the relations between breath groups. However, it is not possible to quantify such features of the data.

Analysis of the data

In theory, it would be helpful to provide further quantitative information about the data. In practice, we suggest that quantitative measures cited in studies of normal language development cannot be calculated reliably or meaningfully in the case of Ruth's language output. Utterances are not clearly demarcated in Ruth's output because she pauses frequently between words and she produces many unintelligible sequences of syllables. Consequently, it is often unclear where one utterance begins and ends (although intonational cues may clarify this), and precisely what words or morphemes it contains. This means that it is not possible to specify the number of utterances collected, the mean length of utterance (MLU), or the maximum length of utterance. Such statistics could be calculated for those utterances which are fully intelligible. However, they would then be based on a selective minority of the sample collected, rather than a random selection, which makes them meaningless as measures of Ruth's language capacity. It has been pointed out that MLU is problematic and unreliable as a measure of normal language development (Klee & Fitzgerald, 1985). Here, the problems are multiplied, invalidating this statistic completely.

Rather than attempt systematic measures which are anyway spurious, this study was based on qualitative data. Since the point was to look at Ruth's utterances in terms of conceptual intentions and their linguistic mapping, the data were analysed by

a. identifying all utterances which express a particular conceptual intention;
b. analysing the linguistic mapping of that intention in terms of the structures Ruth produces, and the errors and omissions she makes;
c. seeking patterns in the linguistic mapping.

Clearly, discussion and conclusions based on such data cannot be generalised, since specific utterances may be exceptional within Ruth's output and/or exceptional in relation to other dysphasic children. The general hazards of corpus collection, description and analysis are even greater in a case such as this, where many utterances are unanalysable and cannot be taken into account. However, as stated above, the point of this study was not to test projected hypotheses, but to identify patterns in one child's mapping of conceptual intentions which would generate such hypotheses.

The study explores these patterns by addressing the following questions:

1. *Conceptual constraints*
   Are there constraints on the conceptual categories and relations which Ruth expresses in language, and are the limitations on her language output of a conceptual nature?
2. *Constraints on mapping*
   a. Memory constraints: are there quantitative constraints on Ruth's output?

b. Linguistic constraints: are there syntactic and/or phonological constraints on Ruth's output?

These questions will be considered in the light of the data analysed, which will be extensively exemplified. Where the corpus of interpretable utterances provides only a few relevant examples, all of these will be cited; elsewhere, a selection of relevant examples will be presented.

The conclusions which emerge from this analysis of the data have implications for the nature of breakdown in the dysphasic child's language processing, and give rise to predictions and questions which will be discussed.

CONCEPTUAL CONSTRAINTS

Range of conceptual structures expressed by utterances

Although there is no limit on the number of concepts and conceptual relations which can be expressed by language, and on the embedding of one conceptual relation within another, there is a limit on types of conceptual relations and their embedding. Essentially, a sentence expresses a proposition comprising a predicate-argument structure, with possible modification of predicate and arguments, and possible embedding of a proposition as an argument or modifier within another proposition (see, for example, Jackendoff, 1983). Ruth's output includes all these types: a variety of modifiers; embedding of propositions as arguments or modifiers; and negation and questioning of propositions and arguments. These intended meanings are identifiable in the words and structures she produces, backed up by the context in which they occur. A few examples of each type are given below, with further examples presented in the Appendix. Examples are accompanied by a gloss of the meaning implied by the context of the utterance. This gloss is not, however, assumed to be a target.[2]

Basic propositional structure. Verbs, adjectives, and prepositions are used as predicates, and nouns are combined with these in the correct order as arguments. These predicate-argument relations are too wide-ranging to exemplify fully, though the data presented in other subsections will substantiate this observation. Here, examples of the range of verb predicates are given, since these are the core of sentence structure. These include verbs in the following semantic categories:

agentive: catch, sing, shoot, shout, work, drive, eat, tickle, laugh, ask, help, play, talk;

state (perceptual or mental): be + Adjective Phrase, like, hate, see, want, think, know, dream, mind, notice;

change of state: die, get, forget;

cause change of state: finish, start, hurt, kill, break, keep, pretend, tell;

location: stay;

change of location: fall, come, go, move, climb, escape;

cause change of location: turn over, put down, put back, pull, take;

[2] Apart from the gloss, details of the linguistic and extralinguistic context of utterances are not provided for reasons of space. Such details are not crucial for the present study, but would clearly be important in considering certain questions beyond the scope of this study. For example, Ruth's language is very interesting from the points of view of social interaction or psychoanalysis, which would involve context beyond the limits of the utterance. Although such contextual information is not presented, it is available on request from the first author.

possession: have, got;
change of possession: lose;
cause change of possession: give, take, buy, borrow, pinch, steal.

Modifiers of basic propositions. Adverbs, prepositional phrases and embedded sentences are used to express locative, temporal, causal and conditional modification of these propositions. Such modification is exemplified below and in the Appendix.

Temporal

1. Ian, he get a pass pass soon (= Ian's getting a bus pass soon.)
2. I ring you last time (= I rang you last time.)
3. [amə] ask her yet (= I haven't asked her yet.)
4. Born, anyway, she not coming to school (= When it's born, anyway, she's not coming to school.)

Causal

5. Because [ə] wrong key, [tə] can't do it (= Because if you use the wrong key, you can't do it.)

Conditional

6. You can ring up [əəə] want to (= You can ring up if you want to.)
7. Go my house, tell you off (= If you go to my house, he'll tell you off.)

Embedded propositions as arguments. Mental state predicates are used together with an embedded proposition as an argument:

8. Nobody know us got monkeys in our head (= Nobody knows we've got (fantasy) monkeys.)
9. You ['rɪnaɪz] my hair cut (= You realise I've had my hair cut.)
10. [zə] can't see [tə] people's getting (= You can't see what people have got.)

Embedded propositions as modifiers. For modifiers of the basic proposition, see items 1 to 7 above. Ruth also modifies arguments by embedding a proposition after the noun argument:

11. This is my—Ian—what borrowed. This Ian's. I borrow it. (= This is Ian's that I've borrowed.)
12. Pretend I've got a gun [du kɑn] notice (= Pretend I've got a gun you haven't noticed.)

Negation of propositions. Ruth expresses negation of propositions:

13. He not come with (= He didn't come with.)
14. She tickling me, I [nɒ] go on [ə] floor (= When she tickles me, I don't go on the floor.)
15. [nə̃ʊʔ ɪnə'brʌp] (= Don't interrupt.)
16. [amə] ask her yet (= I haven't asked her yet.)
17. Because [ɪgæ] any film in it (= Because it hasn't got any film in it.)

In the Appendix, many more examples of negation are presented, and the different forms Ruth uses to mark negation are indicated.

Questioning of propositions. Ruth questions propositions, ie she asks yes–no questions, which can be recognised by their intonation:

18. [təzə] got my telephone number? (= Have you got my telephone number?)
19. [zə] play that game again? (= Shall we play that game again?)
20. You want another scissors? (= Do you want another pair of scissors?)
21. [ðə] help me? (= Will you help me?)
22. You finish? (= Have you finished?)

Again, many more examples of interrogatives are presented in the Appendix, and the structures used to mark these are indicated.

Questioning of arguments. Ruth questions particular arguments within a proposition, ie she asks WH- questions. These can be recognised by their intonation, together with context, and often include a WH- word:

23. [wɒz] wrong with you—[wɪtʃ] wrong with you? [wɪtʃ wɒn wɪv] you? You wrong—you g—[du] wrong? (= What's wrong with you?)
24. You having? (= What are you having?)

For further examples of WH- questions, see Appendix.

Constraints on conceptual structures expressed in utterances

The above data indicate that Ruth uses language to express the essential range and complexity of conceptual structures which sentences encode, as outlined at the beginning of this Section. The data also provide clear evidence that there are conceptual structures which Ruth intends, but which she is unable to map appropriately into linguistic structures: few of the utterances cited as instances of a particular conceptual intention show normal realisation of that intention. (We return to this in the next Section.) It is at least the case that Ruth's conceptual intentions exceed her ability to map these in language, so that her language must be subject to constraints which are not conceptual.

It could nevertheless be argued that the examples above do not exhaust the possible concepts and conceptual relations which language encodes, in that they lack the variety and generality, the complexity and particular conceptual distinctions of normal language use. We will consider these three aspects in turn.

First, it is obvious that Ruth's utterances show a narrow range of lexical and sentential tokens within each conceptual type, even though these have not been quantified and cannot be compared with norms. We suggest that even if the number of tokens per type is very limited, this does not undermine the evidence that the type is within Ruth's conceptual capacity. All the examples of structures attempted by Ruth are spontaneous, and novel at least in the sense that they were produced in contexts she had not encountered before, and often in fantasy play. Since they are spontaneous, they must reflect Ruth's ability to generate the conceptual intention underlying the structure.

A second argument against the suggestion that Ruth's problem is not primarily conceptual is that there appears to be a limit on the conceptual complexity within each utterance. Although Ruth's utterances include embedded propositions, only one such embedding occurs, except perhaps in the case of:

25. Because [ə] wrong key, [tə] can't do it. (= Because if we use the wrong key, we can't do it) (explaining the need to keep the classroom key separate from others on the bunch so that we could lock the door on our way out.)

This suggests double embedding of conditional, within causal, within main

proposition. We may assume that children much younger than Ruth are capable of multiple embedding. However, it could be argued that the limited degree of embedding in Ruth's output is not due to a conceptual constraint on these, since she is capable of at least one embedded proposition, and that multiple embeddings do not occur because of other constraints on her mapping of conceptual structures. Even if conceptual capacity is normal, constraints on linguistic mapping could act as a limit on the expression of that capacity. They could furthermore act as a barrier to certain conceptual developments if we suppose that there are complex propositional structures which can only be conceived if we have linguistic structures to hang them on. Our claim that Ruth's conceptual intentions are not responsible for her limited language does not, therefore, exclude the possibility that her conceptual development is not age-appropriate. (It is very difficult to establish such details of a child's conceptual development non-verbally.)

It should finally be pointed out that certain types of concept and conceptual relation have not been considered, for example those conceptual distinctions expressed by syntactic categories such as auxiliary verbs and determiners. Evidence of certain complexities, including the embedding of propositions, does not constitute evidence for other aspects of meaning not considered here. It may be that certain conceptual categories are inaccessible to Ruth, although this may in turn be due to their linguistic inaccessibility. We will return to this possibility below.

In any case, none of these arguments undermines our claim that conceptual constraints are not primarily responsible for Ruth's language deficit, that is, the claim that Ruth expresses conceptual intentions which she is unable to map into appropriate linguistic structures. This claim is the starting point for looking at how Ruth maps the conceptual structures she intends, and the nature of the constraints on that mapping.

CONSTRAINTS ON THE MAPPING OF CONCEPTUAL STRUCTURES

Deviations in the mapping

Although Ruth uses a range of lexical items and combines them to express complex conceptual relations, her words and word combinations show many deviations from normal language. Her output is often unintelligible, and where it is intelligible, it shows substitutions, omissions and inappropriate combinations within words and sentences. These deviations in her mapping of intended meaning will be classified superficially and exemplified. The types of words and structures which they affect will be identified. The examples so classified will serve as the basis for discussing what description is most appropriate for Ruth's deviations, accounting for the range of substitutions and omissions and the total unintelligibility of many utterances and utterance fragments.

As well as deviations, one could consider the gaps in Ruth's output (ie her failure to use particular structures) as evidence of constraints. However, there is a problem with identifying gaps in a corpus, especially one containing unintelligible utterances. Unlike substitutions and omissions of obligatory elements within utterances, which are identifiable deviations in what the child does produce, gaps in the sample may be an accident of sampling, ie of what the child undertakes to say (Brown, 1973). So while there are very suggestive gaps in Ruth's output which will be cited in discussion, these will not be the focus in analysing the constraints on her output.

The deviations in Ruth's output can be classified superficially in terms of four categories:

1. Phonological omissions and substitutions in words and stereotyped phrases;
2. Phonological substitutions in sentences (unintelligible jargon);
3. Omissions in sentences (agrammatism);
4. Lexical substitutions in sentences (paragrammatism).

Phonological omissions and substitutions in words and stereotyped phrases. Ruth's phonological realisation of words shows omissions and substitutions. These are not consistent across different lexical items, nor even for particular lexical items. Repetition of a word (following a questioning 'Huh?' from the investigator) often leads to a closer approximation, and may even produce the target:

26. [nɛʔ] my school. (Repetition) Next to my school.
27. There is ['bʌzə] bar. (Repetition) ['mʌzə] bar there. (Repetition) Yeah 'me'tal bar (emphatic).
28. (səʔ] under water long time, [ðɛ] hurt my eyes. (Repetition) Stay under water long time, [ðæ] hurt my eyes.

However, repetition does not always approach the target:

29. Yeah, ['vɪgzɪɪl klem]. (Repetition) ['vɪvɪbɪl] plane. [pɪ'tɛnd 'vidəbəl]. [wiə pɪ'tɛnd 'vizəbəl]
    (= Invisible plane. We'll pretend it's invisible.)
30. [tədə səm] secret—[səm] come up my desk, [dəʔ] in my ear. (Repetition) [du] come up s—desk, [dɪʔ] in my ear. [dʒ—dʒɪ] like this (Ruth whispers in my ear).

Although inconsistent, these errors do show some phonological pattern.

a. They typically preserve stress and syllable structure, apart from a tendency to omit and reduce unstressed syllables especially initially:
   31. disgusting → ['gʌstɪn]
   32. invisible → ['vɪgzɪɪl, 'vɪvɪbɪl, 'vidəbəl, 'vizəbəl]
   33. look after → ['kɑftə]
   34. understand → [dæn]
   35. escape → [zgeɪp]
   36. forgot → [gɒt]
   37. brigade → [ə'geɪd]
   38. injection → [prə'ʒɛʔʃən, 'dʒɛʔʃəns, 'sdʒɛʔʃən, 'dʒɛgʃən]
b. They often reduce clusters:
   39. problem → ['pɒbləm]
   40. next → [nɛʔ]
   41. pregnant → ['pɛgnə̃ʔ]
c. They omit, substitute, transpose, and occasionally add vowels and consonants within syllables:
   42. festival → ['fɛsəbəl]
   43. luggage → ['lʌgwɪz]
   44. catch → [gæʔ]
   45. stay → [səʔ]
   46. take → [təʔ]
   47. don't interrupt → [nə̃ʊʔ ɪnə'brʌp]
   48. need → ['nuzu, nuz]

49. you → [ðu, zu, du, də]
50. they → [ðəʊz]
51. in case → [ðə keɪs]

It is notable that similar errors occur in stereotyped phrases (phrases which may be acquired as unanalysed wholes), where whole words and even word combinations are omitted or substituted. Here, the word affected is often initial and unstressed, though initial stressed words may also be affected:

52. Your business (= None of your business.)
53. Your mind up (= Make your mind up.)
54. [ðɛ'pɒn] a time (= Once upon a time.)

See Appendix for further examples.

Phonological substitutions in sentences. Many of Ruth's utterances contain syllables or sequences of syllables which are unintelligible. These generally occur at the beginning of an utterance. It is often unclear whether they map specific word and sentence meanings, and exactly what the intended meaning might be. The data do reveal some consistencies in phonological form and intended meaning, but even here, it remains unclear whether such jargon maps specific lexical and structural targets, or is simply "filler" material which bears no relation to target words.

Recognisable substitutions occur most typically where "minor" items or function words would be expected:

a. in embedded sentences requiring a temporal or conditional preposition
   55. [wɪnwə] finished, we play the game (see Section on Modifiers of basic propositions)
b. in relative clauses requiring a relative pronoun
   56. The big one [tə] got a beard (see Section on Embedded propositions as modifiers)
c. in negative structures requiring auxiliary verb + contracted negative
   57. [amə] ask her yet
   58. [amɒʔ] go [ə] teacher
   (see Appendix)
d. in interrogative structures requiring an auxiliary verb inverted with the subject
   59. [təzə] got my telephone number?
   60. [zə] play that game again?
   (see Appendix)

These examples do not exhaust Ruth's use of unintelligible syllables. Many examples are insufficiently clear to identify any target meaning. It could be that these do map a specific intention, but neither their context nor their phonological form nor the combination of these is adequate to identify that intention. For the moment, no more can be said about these.

Omissions in sentences. As well as substituting jargon for certain words or combinations of words, Ruth omits them. Function words are especially vulnerable: the items which were seen to undergo substitution also show omission. Examples of auxiliary verb omissions are presented in the next section but one. It should be noted, however, that any syntactic category may be omitted. For example, though Ruth uses many main verbs (see Section on range of conceptual structures

expressed), she also omits them:

Agentive: 61. My daddy's—backside (= My daddy sits on his backside.)

State: 62. You can—right through mine. [s] you can—through mine—easy (= You can see right through mine.)

Change of location: 63. No! Over me! You! Over me! ['dulɛnz] go over me, go on (= Go/climb over me.)

Cause change of location: 64. The stuff out (= Get the stuff out.)

Possession: 65. Because [ə—zə—'plɒbləm 'bikɪn] (= Because they've got a problem speaking.)

See Appendix for further examples.

Lexical substitutions. The final category of substitutions is less well defined than the first three, and appears to involve a random mixture of substitutions. The feature they have in common is that they map a specific conceptual relation but select lexical items which are slightly inappropriate for the intended meaning and incompatible with the syntactic frame in which they occur, eg

66. [du] can't 'scape away (= You can't escape/get away.)

The most notable examples involve prepositions which are associated with a head verb or adjective:

67. [hə] shout with my brother (= She shouts at my brother.)

The Appendix presents further examples of these anomalous structures, which in some cases defy any clear categorisation.

The auxiliary subsystem and its role in interrogative and negative structures: illustration of the mapping problem. It has been widely observed that auxiliary verbs are problematic for language disordered children (eg Ingram, 1972; Fletcher, 1983). They provide a particularly clear illustration of the range, limits, and variability of Ruth's mapping of certain meanings: tense, aspect, modality, negation and interrogation. There is clear evidence that Ruth intends at least some of these meanings, but does not always map these intended meanings correctly. Auxiliaries exemplify all types of deviation discussed, showing both substitution and omission. The Appendix provides detailed evidence of the auxiliary type meanings Ruth intends and her mapping of these meanings.

CONSTRAINTS ON THE MAPPING: MEMORY AND STRUCTURE

We have so far provided a detailed picture of one dysphasic child's linguistic output in relation to normal adult utterance structure. In the first Section, the child was shown to express complex conceptual intentions, including a wide range of propositional types, and the embedding of one proposition within another. However, these intentions are not mapped onto conventional language structures. This mismatch between conceptual intentions and their linguistic realisation is, of course, the feature which identifies the child as dysphasic. It is the detailed description of deviations within words and sentences presented in the last Section which enable us to go beyond this general characterisation of developmental dysphasia, and to consider the constraints which account for the discrepancy between Ruth's conceptual intentions and her linguistic mapping of those intentions.

Memory constraints

It has been suggested that dysphasic children have impaired auditory memory, generally with reference to memory for sequences of sounds rather than words or structures. Ruth's case notes refer repeatedly to a limited auditory memory span for sequences of words. Could it be, then, that constraints on auditory memory restrict Ruth's language output? Could it be that long term memory constrains her storage of linguistic forms and structures, and/or that short term memory constrains her planning and execution of forms and structures? We would argue on empirical and theoretical grounds that a description in terms of memory constraints is merely a reformulation of the question as to the nature of constraints on Ruth's output.

Empirically, it is well established that memory capacity is not independent of structure, and this is true for normal adults, normal children, and linguistically disordered children. There is wide-ranging evidence that the memorability of linguistic sequences is contingent upon their phonological, semantic, and syntactic familiarity (eg Marks & Miller, 1964). There is no fixed limit on the number of words in a string that can be recalled; a normal digit span may be ± 7 (Miller, 1956), but the span is much greater than this for words which are syntactically, semantically, and phonologically organised into a sentence. In the case of dysphasic children, it has also been established that structure has more effect than length on repetition of sentences. Menyuk and Looney (1972 a, b) found that dysphasic children's word repetition was affected by morphological structure, and their sentence repetition was affected by syntactic structure. They suggest that simplification in the children's language occurs as a result of "limits on immediate memory which prevents analysis beyond meaning bearing elements". Empirical evidence, then, indicates that memory is not a fixed capacity indifferent to the structure that it spans.

Theoretically, this is unsurprising. Even if there were simply a quantitative limit on memory span, affecting the number of units that can be stored or planned or executed, this would entail a qualitative limit in that the units subject to any quantitative limit must be qualitatively specified. Language involves units of different types which are combined into hierarchical structures. From a syntactic point of view, for example, a sentence consists of constituents which contain a lexical head together with lexically determined or optional modifying phrases. Semantically, this constituent structure maps a state of affairs and the arguments, or participants, involved in that state of affairs, together with various types of modification of these (Jackendoff, 1983). From a phonological point of view, the same sentence consists of one or more intonation units which carry a rhythmic pattern made up of words of varying rhythmic prominence. The rhythmic pattern depends on the constituent structure (Selkirk, 1984). The syntactic and phonological structure are built out of words which themselves consist of a syllable or syllables with a rhythmic structure and a phonemic structure, and which map a conceptual category. (They may be morphologically structured as well.) The claim that developmental dysphasia reflects an auditory memory deficit is not specified with respect to these many different semantic, syntactic, and phonological units. It could mean that there is a limitation on the internal structure of phonological units, eg syllables, words, rhythmic units, intonation units, or on the internal structure of syntactic units, eg words, phrases, sentences. It could mean that there is a limitation on all types of units, whether

independently of each other or in interaction with each other. And it could mean that there is a limitation on phonological and/or syntactic units independently of the meaning they map, or depending on the meaning they map.

The reason for carrying out this detailed case study is to consider these possibilities and generate more specific hypotheses about the constraints on the mapping of meaning in Ruth's language output.

Structural constraints

On the basis of the range of structures produced by Ruth, and the range of deviations within these, we suggest that the constraint on her output is a function of phonological structure and the meaning it maps, ie that Ruth's span for certain aspects of phonological structure is limited, and that this limitation is affected by semantic factors.

The first reason for attributing a problem with phonology to Ruth is that at least one of the deviations described above involves phonology only. In the case of phonological omissions and substitutions in words, the semantics and syntax of the sentence are unaffected; the phonology of the sentence (rhythm) is unaffected; only certain aspects of word phonology are affected. The range of errors provides some pointers to the aspects of phonological structure which are problematic. It appears that stress and syllable structure are preserved relative to the phonemic details of syllables. Phonemic realisation of initial unstressed syllables is especially vulnerable, and they are often omitted altogether. This suggests that Ruth's memory for phonemic detail may be limited, and this limitation may depend on syllable position and stress.

Similar observations can be made about Ruth's realisation of idioms or stereotypes, which do not involve active syntactic or semantic processing. Ruth's distortion of these does not alter their overall syntactic, semantic, or rhythmic structure. Rather, it involves the omission of initial or unstressed words in the idiom, or substitution for one or more of these words. Again, it seems that position and stress affect phonological realisation, in this case in the output of words rather than syllables.

The question is whether such a phonological description can be extended beyond deviations in words and idioms where syntax and semantics are not at stake, to account for deviations in syntactic-semantic structures. Such deviations include the omissions and substitutions within sentences described above.

It should first of all be noted that none of these deviations result in *deviant* syntactic, semantic, or rhythmic structures in the following sense. Words may be omitted, distorted, or replaced, which limits the semantic, syntactic, and rhythmic structure of the sentence. But in no case is there production of abnormal constituent structure, such as inappropriate order of words within phrases or phrases within sentences, with correspondingly abnormal semantics. Nor are there cases of abnormal rhythmic structure, such as inappropriate timing of words within phrases or phrases within sentences. Any structure which Ruth does produce is produced with appropriate sequencing and timing.

Where Ruth's output deviates, it does so by omission and phonological substitution (jargon). The question is whether there is any semantic, syntactic, or phonological pattern in these omissions and substitutions, ie whether particula-

categories are vulnerable. The data are not transparent with respect to this question, since the targets of utterances containing omissions and jargon are not sufficiently specifiable to identify reliably which categories are or are not affected. It does seem that function words are vulnerable. Auxiliary verbs, sometimes in combination with pronouns; markers of subordinate clauses such as relative pronouns, complementisers, and prepositions; WH- words; and determiners are all liable to omission or substitution. However, it is in the nature of function words that they are obligatory and therefore predictable given linguistic and extralinguistic context, so that their absence or replacement is generally detectable. Content words are less predictable, so omission or replacement of content words is less uniquely identifiable. There are instances of content words, in particular verbs, being omitted, and accompanying function words may even be preserved in the absence of these content words. There are also sequences of jargon whose target is unidentifiable and which could be standing for intended content words. It could therefore be that the apparent susceptibility of function words to omission and substitution is an illusion created by the predictability of function word targets and the unpredictability of content word targets. This would imply that Ruth's omissions and jargon are linguistically random, with different linguistic categories being equally affected.

However, there are theoretical and empirical grounds for thinking that this is not the case, but that function words are differently affected, and that the source of their difficulty is their phonological characteristics. We noted above that within words, stress and position affect preservation of the phonemic detail of the syllable, and that within idioms, stress and position affect preservation of the word. If the same pattern occurred within sentences, the stress and position effects would mean that any type of word might be omitted (just as any type of syllable within a word might be omitted), but that function words would be more vulnerable than others because of their characteristic stress and position within phrases. Within the rhythmic structure of a sentence, function words:

a. are weaker beats, ie less stressed, than content words, eg 'Ruth can 'swim;
b. are liable to reduction unless they occur phrase-finally, eg Ruth /kən/ swim;
c. can, in some cases, be contracted onto the preceding word, eg She'll swim

(cf. Selkirk, 1984 for further analysis and examples). Thus, the phonological properties of function words within the sentence are analogous to the phonological properties of unstressed syllables within the word. In most cases function words occur initially in the phrase, preceding a phonologically more prominent word, eg transitive prepositions precede a noun, and auxiliary verbs precede a main verb. Thus, the position of function words in the phrase is analogous to the position of initial syllables in the word. The omission of function words or the production of unintelligible jargon where function words are required within sentences is then analogous to the omission of syllables or their substitution within words.

Apart from the theoretical coherence of this phonological description of omissions and jargon, there is some empirical evidence to support it. In certain structures, function words occur phrase-finally due to ellipsis. In such structures, function words cannot be reduced or contracted. Here, then, the usual position and stress of function words are reversed. We noted that Ruth does not distort or omit auxiliary verbs in these structures (see Appendix). Since the syntax and semantics of auxiliary verbs is the same in phrase-initial as in phrase-final position, it would seem that the

preservation of phrase-final auxiliary verbs is due to their distinct phonological properties. Conversely, auxiliary verbs are most vulnerable when they should occur sentence-initially. The total absence of auxiliary verbs inverted with the subject NP in interrogative structures contrasts with their occasional appearance following the subject NP, and again echoes the treatment of initial unstressed syllables in words. These observations are supported by Fletcher's study of auxiliary verbs (1983) which shows that auxiliary verb forms are very reduced in adult utterances to children even in sentence-initial position. Fletcher also proposes that deficiencies in auxiliary verbs in the language-impaired child are due to their phonetic character.

The hypothesis of a limited span for phonological structure, which particularly affects unstressed and initial elements within a structure, may provide a unitary account for three of the four apparently unrelated deviations identified in Ruth's output: phonological omissions and substitutions within words, omissions in sentences, and phonological substitutions in sentences. The deviations labelled as lexical substitutions remain to be considered.

It is again notable that neither word order nor rhythmic structure are implicated in these deviations. Ruth's paragrammatisms are within-class substitutions. They do not misorder a category, but select the wrong member of the category for the semantic and syntactic context. For example, when Ruth uses a verb or adjective which governs a preposition, she may provide a preposition, but not necessarily the specific preposition required. When Ruth uses an auxiliary verb, she will place it correctly after the subject NP, but the verb used may not be the one required for the specific linguistic or extralinguistic context. These substitutions suggest a problem with differentiating subcategories within certain types of category. In order to elucidate this final set of deviations, we must consider the characteristics of the words which undergo these within-class substitutions.

The words involved seem to be marked by two features. First, they are function words. They therefore fall into a category already identified as problematic for Ruth, since they are liable to omission or substitution with jargon. Their vulnerability is, we suggested, due to their phonological properties, being typically phrase-initial and unstressed. The second feature of the words which undergo within-class substitution is that they are not only phonologically dependent, as are other function words; they are also semantically dependent. That is, they do not have a meaning in their own right. Where they contribute any meaning to the sentence, that meaning is determined by the word they modify. For example, prepositions governed by a verb or adjective have no independent meaning, serving only to mark an argument of the verb or adjective (eg "shout at NP", "angry with NP"). Auxiliary verbs encode aspectual and modal distinctions, but their particular meaning often depends on the aspectual and modal qualities of the particular verbs they modify. For example, progressive *be* may be used to express present time with process verbs (eg "I'm working") or planned future with verbs expressing plannable events (eg "I'm leaving soon"), but it cannot express present or future with state verbs (eg *I'm liking you (soon)") (see, for example, Huddleston, 1984). Indeed, there is some evidence that the normal child's use of auxiliary verbs is sensitive to the aspectual qualities of the main verb (Johnson, 1985), suggesting that these are related. In the case of elliptical structures (eg "I am"), the verb modified by the auxiliary is implied by preceding linguistic context, so that the auxiliary verb is not only semantically contingent on

an implied verb, but is also serving as a proform for an entire verb phrase. The elliptical structure as a whole serves to assert or deny a preceding proposition, and the auxiliary verb contributes no independent meaning to the assertion or denial of the proposition.

The fact that Ruth makes substitutions between members of these particular categories suggests that she has difficulty in differentiating their semantic/syntactic role. Since she does not make such within-class substitutions for other categories, this must be due to their particular semantic/syntactic properties. According to the above description, the problem occurs with words which have no independent meaning, but which may acquire meaning through combination with heads of phrases, either as markers of argument roles or as temporal dimensions of verbs.

This description raises several questions about the source of the problem, and its relation to the putative problem with phonological properties of function words. It could be that the problem is of a conceptual nature, ie that there are subtle meanings such as temporal and aspectual distinctions which Ruth does not control. If this is the case, our original claim that conceptual limitations are not responsible for Ruth's limited output would require some modification. However, it could also be that the apparent semantic problem is inextricably connected to problems with phonology. That is, certain meanings may be inaccessible for Ruth when they are expressed by certain phonological forms.

In conclusion, we suggest that Ruth's primary problem is with word and sentence phonology. Though her utterances are superficially "unintelligible" and "ungrammatical", the scope of her output and the deviations within it point to phonological structure as the source of her impaired language processing. The omissions and substitutions which she makes appear not to be determined by syntactic factors; rather, they affect elements within words and sentences which are unstressed and which precede word or sentence stress. A constraint on the processing of phonological detail within a rhythmic structure would, though, give rise to limited syntactic structure, since basic syntactic structure depends on classes of words which are unstressed and precede stressed items, and more complex syntactic structure (eg multiple embedding) depends on extended phonological structure. A constraint on phonological processing could also account for the few errors which do involve specifically semantic/syntactic confusion, since these generally occur in items which are phonologically weak. We have suggested that Ruth's misuse of certain prepositions and auxiliary verbs may arise because these forms are not only semantically and syntactically dependent, but are phonologically weak, which may limit her access to them. We acknowledge, though, that there may be independent problems with certain semantic distinctions, eg those involving temporal concepts. The interaction or interdependence between language and conceptualisation in this particular domain invites further exploration.

Thus, a phonological description provides a unified account for a wide range of limitations observed in Ruth's output: omissions, substitutions, and limited structural complexity. The hypothesis that an apparently syntactic impairment may be phonological in origin is, furthermore, consistent with diverse developments in psycholinguistic research. Recent work on adult agrammatism (Kean, 1982; Black, 1980) and on the acquisition of syntax (Gleitman & Wanner, 1982; Landau & Gleitman, 1985) point up the role of prosodic structure in the processing of syntax.

Further issues

This tentative explanation of Ruth's output begs further investigation.

First, it is important to explore more rigorously the claim that Ruth's problems in outputting language reflect limitations on phonological mapping. This means looking more systematically at Ruth's phonological realisation of word meanings to determine the effects of position and stress on the realisation of syllables in words and of words in phrases. In particular, it is important to confirm that words and phrases are independent units whose internal structure is affected in the same ways. This means showing that pre-stressed syllables of words and pre-stressed words of phrases are significantly affected, but that the internal structure of the word and the internal structure of the phrase do not affect each other. The implication of such similar but independent effects on words and phrases is that word meanings and phrase meanings are separately mapped into phonological structures. These issues could be investigated systematically using repetition tasks which elicit output of words and phrases controlled for their internal structure. If the effects on words and phrases were confirmed, they would be significant for the organisation of phonological output in models of language production (eg Garrett, 1982).

A second question arising from this study is the relationship between output and input processing. Is output alone constrained in the ways observed, or is input subject to the same constraints? It could be that Ruth's processing of input matches the pattern observed in her output, ie that there are limitations on her recognition and comprehension of phonological detail within a rhythmic structure, and that unstressed items preceding stress are especially vulnerable. It may be, furthermore, that such limitations on the mapping of input onto meaning have been integral to Ruth's language development, so that they have precluded access to certain aspects of adult language. If Ruth has never been able to hold certain phonological details within a phonological structure, she will not have been able to identify certain phonological items (eg certain function words) and their syntactic-semantic role. Limitations on current output processing would then be the outcome of the constraints on her language development imposed by limitations on input processing. They would reflect the confrontation of her limited capacity for processing input phonological structure with the input structures she encountered. This confrontation would mean that only selective fragments of the input could be mapped onto meaning. Variability in output could then reflect the different possible outcomes of this confrontation, ie the different ways of resolving the tension created by attempting to process input structures which exceed processing capacity. Though certain items may be more vulnerable than others, to the point of becoming totally inaccessible, there may be some flexibility as to which fragments are held and mapped. The alternative to this possibility is that Ruth's input and access to the possibilities of adult language were not so impaired, and that the constraints are confined to output. In this case, Ruth would know what she is aiming for in output, but would be unable to realise her target fully.

Given present evidence, these possibilities remain speculative. This study has confined itself to linguistic output at a particular point in Ruth's development. The only evidence of comprehension comes from formal comprehension tests, which reveal a deficit and have done so since age 5. However, these tests do not reveal deviations in input with the same specificity as spontaneous output data. They

cannot indicate whether Ruth's input mirrors her output, with the input equivalent of the omissions and substitutions observed within her word and sentence output.

The reason for focusing on output is that it provides a rich source of evidence of spontaneous language capacity. As she talks, Ruth sets up her own "experimental conditions", by which we mean the conceptual intentions she seeks to express, which must be mapped in particular ways by the adult system, and which she maps in terms of her own system. It is much more difficult to tap Ruth's input processing. Comprehension tests or judgement tasks are metalinguistic tasks which do not tap spontaneous behaviour directly, and neither these nor observation of functional comprehension reveal Ruth's ability to understand very specific aspects of language. For example, it is apparent that Ruth's output of auxiliary verbs is impaired, since she omits or distorts them in contexts in which they are required. It is much more difficult to determine whether they are also impaired in input: whether Ruth could recognise that they have been omitted or distorted in an utterance she hears, and whether she could understand their specific semantic role. Judging sentences or pointing to one of a set of pictures corresponding to a sentence require concentration and reflection not demanded by spontaneous language recognition and comprehension. Because of these limitations in the investigation, we cannot say whether the observed constraints on Ruth's output are mirrored in input.

Similarly, the cross-sectional nature of the study precludes us from drawing any conclusions about the relation between Ruth's input processing in early language development and her current output. Only a longitudinal study which investigated early capacity for word and sentence phonology and compared this with subsequent output would clarify the role of input constraints in the establishment of phonological-semantic mappings to be recruited in output. Given the methodological problems inherent in investigating input at a late stage of development, it is hard to conceive of such a study of early language development. Clearly, we will need more refined methodological and conceptual tools to investigate such far-reaching questions.

A third major question concerns the generality of these findings. The purpose of this single case study was to allow a detailed exploration of the linguistic mapping of conceptual intentions by a dysphasic child. Clearly, the observations made about the scope and limits of her utterances cannot be generalised to other dysphasic children. However, the conclusions drawn here are not incompatible with other studies of dysphasic children's output. For example, a syntactic analysis of dysphasic children's output in relation to normal output by Morehead and Ingram (1973) revealed that many aspects of syntax, including grammatical relations and base syntactic order, did not differ between dysphasic and normal groups. The groups did differ, though, in the lexical variety used with each construction type, in their use of questions, and in their use of noun and verb affixes. These findings imply that syntactic relations in general are not impaired, leaving it unclear why other aspects of language are a problem. More explicitly relevant to the present study is Menyuk and Looney's (1972b) study of sentence repetition by dysphasic children which revealed a correlation between the percentage of phonological errors within words and the percentage of syntactic errors. This suggests that the combination of phonological errors in words and "syntactic" errors in sentences observed in Ruth is not unique, and further motivates the hypothesis that the two are connected.

Menyuk and Looney also found that meaningfulness and morphological/syntactic structure affected phonology, providing support for the proposal that the problem is not defined purely in terms of segmental phonology. Even more pertinent is the study by Fletcher (1983) mentioned above, which concluded that the deficiencies in auxiliary verbs and inflections in the language-impaired child may lie in the phonetic character of these items, their realisation being "too brief—not salient enough for him to establish a sound-meaning link in his repertoire". Clearly, the role of phonological factors and lexical semantic factors, as opposed to syntactic factors, has been identified in a variety of studies of dysphasic children.

The question is whether the more specific patterns observed in Ruth are typical of other dysphasic children. This does not imply an identical range of deviations, since children may find different resolutions of the conflict between their limited processing capacity and the language to be processed. For example, children may respond to the unavailability of phonological detail in different ways. Some may omit whatever is unavailable; others may provide "filler" phonology (jargon); others may show omissions and jargon, as Ruth does. The issue is whether other dysphasic children, or subgroups of children, show the same *patterns* in output, ie a wide range of propositional types, with appropriate sentence phonology and syntax, deviations affecting word and phrase structure and effects depending on position and stress within word and phrase.

The more controlled tasks needed to explore these suggestions about Ruth's output more systematically could usefully be extended to other dysphasic children who have sufficient output to make comparisons.

The implications of such a construal of dysphasic children's language are considerable. Though therapeutic strategies are beyond the scope of this paper, the conclusions drawn do beg some questions about intervention with a dysphasic child like Ruth. If phonological details within word and sentence structures are the core of the problem, due to constraints on phonological processing, intervention which focuses on building up syntactic structure may be of little help to the child. Increased input, even structured input, would not overcome the limitations on the child's semantics-phonology mapping. Input adapted to the child's processing capacity may be more helpful. For example, difficult items may be placed in stressed or post-stress position, within short structures, making them maximally accessible.

At the same time, it may be acknowledged that the conflict between the child's capacity and the target language cannot be fully resolved, and that a shift in focus away from the target language is needed. Perhaps we need to consider ways of adapting to the constraints on the dysphasic child rather than trying to adapt the dysphasic child to normal language.

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APPENDIX

Modifiers of basic propositions

Temporal

Stay under water long time, [ðæ] hurt my eyes (= When I stay under water a long time, it hurts my eyes.)
Yes, lock it. After us.
. . . take you my house see 'em one day.
[abə] back in 'bout six minutes (= I'll be back in about six minutes.)
[wɪnwə] finished, we play the game (= When we've finished, we'll play the game.)
Me bigger, go worki' in a farm (= When I'm bigger, I'm going to work on a farm.)
I want [dʌŋ də] do, Aeroplane, you talk [ə] me please (= When I want something to do, I say, Aeroplane, you talk to me please.) (Aeroplane = name of fantasy monkey).

Causal

Cos her too fat (= Because she's too fat.)
Because [u] gets dirty (= Because you get dirty.)
. . . [ləu] it's [dəʔ] mummy and me left at home (= . . . so it's just mummy and me left at home.)

Conditional

[də] lost this, phone up (= If you lose this, someone phones up.)
[gɪmɪgɪmɪ] job (= If someone gives me a job.)
Because [ə] wrong key, [tə] can't do it (= Because if you use the wrong key, you can't do it.)
[tu] come back [t] not good [du] come back again (= You come back again if you're not well.)
[zu zgeɪp ðə f-] we find you. You come back here, no food. (= If you escape, we'll find you. When you come back here, you won't get any food.)
[tədə] someone ring, [tədə] put a note down, right (= If someone rings, put a note down.)

Embedded propositions as arguments

[pi't'nd 'vidəbəl] (= Pretend it's invisible.)
Told you I got lots
Pretend I've got a gun [du kʌn] notice (= Pretend I've got a gun you haven't noticed.)
Think so—she will (= I think she will.)
Pretend you [dəʊnəʊ] me—know me. You's dunno I b—you d—you dunno me. (= Pretend you don't know I'm behind you.)
[tə ɑks] them what that is (= Have to ask them what that is.)
She [dəʊn] mind a girl [ə] boy (= She doesn't mind if it's a girl or boy.)
[sɪŋzə pɛgnəʔ] (= I think you're pregnant.)
I know my phone number is (= I know what my phone number is.)
[bænɪʔ tu tu] hear your voice—[thuz] it is (= When I heard your voice, I knew who it was.)
Go [ə] church for (= That's what I go to church for.)

Embedded propositions as modifiers

[vju] got a pen—borrow? (= Have you got a pen I can borrow?)
The big one [tə] got a beard (= The big one that's got a beard.)

Questioning of arguments

What

You the matter with you? [du] matter with you? (= What's the matter with you?)
[wɒs] your name?
[wɒə] your problem? [wɒs] your problem? (= What's your problem?)
[ðju gəʔ—ðju] got for Christmas? (= What did you get for Christmas?)
[dju wɒn wə] me for? (= What do you want me for?)

Who

Who's speaking?
Who that girl is? (= Who is that girl?)

Where

Where you going to—today?
Where are me? Am I? (= Where am I?)
Where [ə] she gone?

Why

Why you got [ə] keys? (= Why have you got the keys?)

Which

[wɪ] thing? (= Which thing?)
Which one? That one or that one?

Phonological omissions and substitutions in stereotyped phrases

Ask me (= Don't ask me.)
Come over there [ɪz fɑs ɪz iz kæn] (= He comes over there as fast as he can.)
[du] matter with you (= What's the matter with you?)
['θæŋkəz] doctor (= Thank you doctor.)
[ə'wantʃə] (= What happened to you?)
And those two and [ə] dog is ['æbi] after (= And those two and the dog lived happily ever after.)
[ðæ] after after. Amen (= They lived happily ever after.)

Omissions in sentences

Agentive:

[awan dʌŋ də] do, Aeroplane, you talk [ə] me please (= When I want something to do, I say . . .)
Because [ə] wrong key, [tə] can't do it (= Because if you pick/use the wrong key . . .)

State:

[amɒʔ] go [ə] teacher (= I'm not going to be a teacher.)

Change of state:

[ɪsə] upset (= He gets upset.)
My mind now, yeah. [θɪmaɪa tʃeɪn] my mind now (= I've changed my mind now.)
And your mouth shut (= Keep your mouth shut.)

Location:

You my school (= You go to my school.)
[ɛz] minute (= Stay there a minute.)
Me under water (= I go/stay under water.)

Change of location:

Back (= They go back.)
You outside (= You go outside.)

Cause change of location:

That window down, to come and pinch your money (= They'll pull that window down . . .)
[tə] money with us, [ðə] case (= We should take our money with us in case.)
[s] packed lunch with us (= We'll take a packed lunch with us.)
[də] puppets on here (= Put the puppets on here.)
[ðə] books over (= Turn the books over.)
No, the plane with us (= No, we take the plane with us.)
She out now (= Show her out now.)

Possession:

Because [ə] same name (= Because she's got the same name.)

Change of possession:

[də] not a point, [ɪz] nothing (= If you don't get a point . . .)

Lexical substitutions

You go my school, you get a teacher (= You go to my school, so you must be a teacher.)
You get swimming things with you (= You bring your swimming things with you.)
He'll help with me (= He'll help me.)
[ðə] next door [ɪ] very angry [ən] you. Those lot next door to us [əʊz] angry. On you (= Those lot next door to us will be very angry with you.)
Someone take over her anyway. Someone take over with her (= Someone will take over from her.)

The auxiliary subsystem and its role in interrogative and negative structures: illustration of the mapping problem

The evidence that Ruth intends at least some auxiliary type meanings lies in her use of temporal and aspectual adverbials. Her use of "last time", "soon", "before", "after", "some time", "one day", and embedded propositions functioning as temporal modifiers reflect references to past and future time. Her use of "yet" implies perfective aspect.

In some cases, context strongly implies aspect or modality, though it is impossible to be sure that Ruth intends these:

[tə ɑks] them what that is: implies obligation, ie "have to"
You ['rɪnaɪz] my hair cut: implies perfective aspect, ie "I've had my hair cut"
This is my—Ian—what borrowed: implies perfective aspect, ie "I've borrowed"

Furthermore, auxiliary type meanings are occasionally explicit. There are examples of past tense; of some full and reduced forms of "be", "have", "can", "will"; and of present and past participles:

be (usually copula):

Pretend you're tickling me
I'm eleven now
He's fireman, see
You're laughing
These [ə] hurting me
I am a baby at that age
Because all of them are sharp
That is Christine
I am—dreaming

have:

I've been on television before
I've grown up
My friend's got one of those like that
[ævn̩] been there yet

can:

Can hear them
You can watch
I can sing actually
She can eat sweets
You can see me
We can ['lɪtən] in here

will:

He'll help with me
I'll photo [ŋ] you
I'll learn you [ə] swim
No, I'll go on it
She will like it

Participles:

telling, tickling, laughing, hurting, eating, dreaming, going, been, borrowed, broken, gone, grown up

The widest range of auxiliary verbs, and those which are reliably supplied, occur in elliptical utterances where auxiliary verbs necessarily take their full form and occur phrase-finally:

be (often copula):

No, I am
Oh yes you are
[thuz] it is
Those don't know where [ðər] are
I know my phone number is
I am?
Course we are
No, Ian is
No, [ɪʔɪzən]
[ðə] good folder, you are (= You're a good folder.)

have:

I has
I have

do/don't:

No I do, I hate drawing (= I don't, I hate drawing.)
Sometimes I do, sometimes I don't

can/can't:

You can—[ɵə] want to
You can't shoot—I can
No [ʒə] can't
[nɪs] one can

will/won't:

Yeah [ə] course [i] will. She can
I will
Oh yes you will
Oh no you won't
Think so—she will

While auxiliary verbs and inflections are sometimes intended and occasionally expressed, there is a notable absence of modals: there are no instances of "shall", "must", "may", "could", "would", "should". There are also no instances of two auxiliary verbs co-occurring. Furthermore, there are many instances of obligatory or implied auxiliary verbs being omitted:

Past tense:

Know your voice (= knew.)
Oh yeah I take that (= took.)
I ring you last time (= rang.)
We walk up (= walked.)

be:

You and me getting married
This pup grown up now
That me again
Both of them dead
You dead and killed
My brother bigger than you
She left out see
Us going on Friday
He get a bus pass soon

have:

And me got a hat
I borrowed it (= I've borrowed it.)
Oh no you [əˈgɒtən] (= You've forgotten.)

Modal:

Her come in some time (= can/will.)
The people come up [ðət—tə] ladder (= might.)
Me borrow mum camera us go out (= I'll.)
He drive a car (= he'll.)
Because he get wet (= he'll.)
[jə] baby come out soon (= will.)
Here I do it for you (= I'll.)
Go my house—tell you off (= he'll tell you off.)
Someone take over her anyway (= will.)
Dead (= You'll be dead.)
[bæʔə] have a baby (= She's going to have a baby.)

There are examples of jargon where auxiliary meanings are intended:

be:

This [əə] nice place
[ðæðə] good idea
Pretend [aəzə] doctor

have:

Pretend [aha] hidden—[hʊd]—hidden
[djʊə] finish yours turn now (= You've finished your turn now.)

Modal:

[ðə] buy there (= We'll buy it there.)
[ðə] come in there (= They might come in there.)

And finally there are examples of substitution where Ruth uses an auxiliary form which is not appropriate for her intended meaning, and sometimes for syntactic context. This is especially typical of elliptical structures containing a pronoun and auxiliary verb, where the auxiliary verb selected is incorrect for the context:

Non-elliptical:

Pretend you shot me (= present.)
My brother Stephen he's give us present (= past.)
On Saturday I ringing you (= past non-continuous.)
Pretend I've got a gun [du kɑn] notice (= perfective.)
My friend Kate and me we talking to ourselves some days (= present habitual.)
She tickling me, I [nɒ] go on [ə] floor (= present habitual.)
You's try it now
Who's care
Pretend I'm get you killed
} (redundant 'be')

Elliptical (with the investigator's preceding utterance in curved brackets):

(I do like you really) → No you won't
(I've got to start?) → Oh yes you are
(Shall we go out now?) → Course we are
(That's not me) → Oh yes you are
She tickling me, I [nɒ] go on [ə] floor. She can! (= She does.)
(I wish I knew you then) → You have now
(What shall I do at that desk?) → Working
(Is she at home?) → Yeah, in the morning she's does
(No you won't) → Yes I am

Auxiliary verbs play a key role in the formation of negative and interrogative structures, so inevitably Ruth has problems with these structures.

In adult English, negation is marked by *n't*, which is attached to the tensed auxiliary verb, or by *not*, which follows the tensed auxiliary. Ruth occasionally uses a negative auxiliary correctly (generally *don't/can't*), but she uses a variety of other structures for expressing negation. These include

a. *not/no* with omission of the auxiliary verb
b. *got* with the negative indefinite *any* and omission of the auxiliary verb
c. certain idiosyncratic forms for the negative auxiliary or subject pronoun with negative auxiliary.

don't/can't

[dəʊ wɒnu] (= I don't want to.)
Because you [dən] like—those [dən] like you (= Because they don't like you.)
Ian don't [nudu] it. Ian [dəʊwə̃ʔ nuz] it . . . (= Ian doesn't need it.)
I [də] mind. I [nədəə] mans (= I don't mind a man teacher.)
[kənə'mɛmbə] her name (= Can't remember her name.)
[ðu kɑn] catch (= You can't catch.)

not/no

You not having my Aeroplane
[tu] come back [tə] not good (= You come back if you're not well.)
She not eating ['ɛvəəɪŋk] (= She isn't eating everything.)
That one not working, see
She no coming back in

got any

[həʔtsə] got any teeth down [ə] bottom. Nanny got any teeth up [ə] top got any teeth down [ə] bottom (= Nanny hasn't got any teeth at the top or bottom.)
[tə] got any girls' brigade camping (= There isn't any girls' brigade camp.)
[nɒʔ] Andrew got any ['tɛlə'nʌmbə]—telephone number yet. Andrew he's got any telephone ['nʌmbɑbʊ]—telephone number yet (= Andrew hasn't got a telephone yet.)

Jargon for negative

[anə] telling you (= I'm not telling you.)
[amə] fall [ɑʊl] the bed yet (= I haven't fallen out of the bed yet.)
[amɒʔ] go [ə] teacher. [amə] go [ə] teacher (= I'm not going to be a teacher.)
[amənʊnə] steal things, no. [amə] steal no (= I don't steal things.)
[nəʊ næʔ] my mum there. Her shopping (= My mum wasn't there.)
[nəʊ ŋ] me going out with my own (= I'm not going out on my own.)
No my mum [ʌmnə] shout at me, no (= My mum doesn't shout at me.)

In adult English, interrogative structures are marked syntactically by inversion of the subject and auxiliary. Ruth's questions are recognisable from their intonation, but they are never marked as questions syntactically, since they never include a clearly identifiable auxiliary verb. Generally, the auxiliary verb is omitted, or an idiosyncractic form appears where auxiliary and subject pronoun would occur:

Omission of auxiliary

You go [ə] church? (= Do you go to church?)
That hurt? (= Does that hurt?)

Jargon for auxiliary + subject pronoun

[də] got—er—Coconut with you? (= Have you got Coconut with you?)
[ə] go back there again? (= Shall we go back there again?)
[ðə] go home now? (= Shall we go home now?)
[də] play skipping? (= Shall we play skipping?)
[də] type that for me please? (= Will you type that for me please?)
[ʒ] got a husband? (= Have you got a husband?)

Occasionally, the main verb is lost along with the auxiliary verb and subject pronoun:

[ðə] two peanut please? (= Can I have two peanuts please?)
[sa] my pretty pink one? [sə] like my pretty pink? [sə] like my pink one? (= Do you like my pretty pink T-shirt?)
[pɪ] pen please? (= Can I have a pen please?)

There are a very few examples where an inverted auxiliary verb-like form occurs which cannot be reliably identified due to reduction, or which is anyway not appropriate to the semantic and syntactic context:

[dju] help me please? (= Will you help me please?)
[vju] got a pen—borrow? (= Have you got a pen I can borrow?)
[dɪdju] like horses? (= Do you like horses?)

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